



Office of Facilities Management
DEPARTMENT OF VETERANS AFFAIRS

FCA ADD/RELACE MECHANICAL SYSTEMS
JAMES E. VAN ZANDT VA MEDICAL CENTER

Bid Documents

Contract No. VA-244-11-RP-0018

Project No. 503-11-101

Project Calculations

September 26th, 2011.

CVA

14801 Murdock Street

Suite 135A

Chantilly, VA 20151

Phone: (703) 955-7160

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cVa, Inc.**4304 Evergreen Lane, Suite 204****Annandale, Va. 22003****Telephone : (703) 914-1416 Fax : (703) 914-1420**

LIGHTING CALCULATIONS

PROJECT NAME: VAMC, Altoona, PA.**PROJECT NUMBER: 443-1102****DATE: 08/11/2011****NAME OF ROOM: #180****VALUE****FIXTURE:****LUMINAIRE TYPE**Fluorescent
1X4**NUMBER OF LUMINAIRE(S)**

24

MOUNTING HEIGHT FROM CEILING (H_{cc})

0

CEILING CAVITY RATIO (CCR)

0

NUMBER OF LAMP(S)

2

LUMENS PER LAMP

2850

LUMENS PER LUMINAIRE (L)

5700

ROOM INFORMATION:**HEIGHT (H)**

14

LENGTH (L)

58

WIDTH (W)

42

LENGTH ADDED TO WIDTH (P)

100

AREA OF ROOM

2436

WORK PLANE HEIGHT FROM FLOOR (H_{fc})

0

FLOOR CAVITY RATIO (FCR)

0

HEIGHT ABOVE WORK PLANE (H_{rc})

12

ROOM CAVITY RATIO (RCR)

2.46305419

REFLECTANCES:**CEILING (R_c)**

80

WALL (R_w)

50

FLOOR (R_f)

20

COEFFICIENT OF UTILIZATION

0.7

LOSSES:**LUMINAIRE AMBIENT TEMPERATURE**

1

VOLTAGE TO LUMINAIRE

1

LUMINAIRE SURFACE DEPRECIATION

0.9

ROOM SURFACE DIRT DEPRECIATION

0.95

LAMP LUMEN DEPRECIATION

0.95

LAMP BURNOUTS FACTOR

0.95

LUMINAIRE DIRT DEPRECIATION

0.95

LIGHT LOSS FACTOR (LLF)

0.73305563

FOOTCANDLES

28.8166694

FEATURES & SPECIFICATIONS

INTENDED USE

Intended for mounting heights up to 25' that require high light levels. Ideal for the medium to heavy-duty areas, warehousing, storage or task lighting.

CONSTRUCTION

Channel and embossed reflector constructed of die-formed cold rolled steel with longitudinal V-grooves in the channel for strength. Rotor style, locking lampholders with enclosed contacts and an audible click are standard with deep endplates that exceed the height of the lampholders. Available in 4', or 8' tandem wired lengths. Accepts plug-in option for 1, 2 or 3 primary circuits.

FINISH

Five-stage iron phosphate pretreatment ensuring superior paint adhesion and corrosion-resistance. Reflector and channel to be finished with a high-gloss baked white enamel. Reflector is painted after fabrication.

OPTICAL SYSTEM

Solid-top or apertured uplight reflector is die-embossed, constructed of heavy-gauge cold rolled steel and painted after fabrication. Baked white enamel finish standard, porcelain is available.

ELECTRICAL SYSTEM

Thermally protected, resetting, Class P, HPF, non-PCB, UL listed, CSA certified ballast standard. Sound rating depends on lamp/ballast combination. AWM, TFN and THHN wire used throughout, rated for required temperatures.

INSTALLATION

For unit or row installations, surface or suspended mounting.

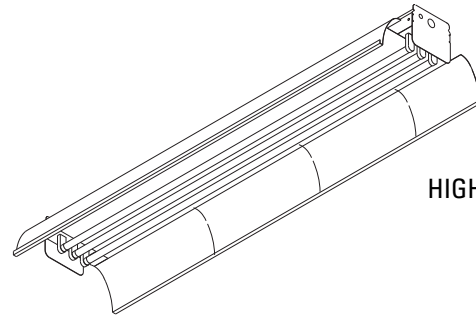
LISTING

UL Listed (standard). CSA Certified or NOM Certified (see Options). UL Listed for damp locations.

Catalog Number	
Notes	Type

Heavy-Duty Industrial

AFP



HIGH-OUTPUT T5 AND T8
4' or 8' Length
1, 2, or 3 Lamps

T5
Technology

Specifications

AFP H0

Length: 48 (121.9)
Width: 13-3/8 (33.97)
Depth: 6-5/8 (16.82)
Weight: 16.3lbs / 7.4kg

All dimensions are inches (centimeters) unless otherwise noted.

ORDERING INFORMATION

For shortest lead times, configure product using **standard options (shown in bold)**.

Example: AFP 2 54T5H0 MVOLT

Series	Number of lamps	Lamp type	Voltage	Options
AFPST Solid reflector	2	32 32W T8 (48")	120	GEB10IS Electronic ballast, instant start, T8
AFP 10% uplight apertured reflector	3'	28 28W T5 (46")	277	GEB10PS Electronic ballasts, ≤10% THD, program start
	Not included	54T5H0 54W T5 (46")	347	EL14 Emergency battery pack (nominal 1400 lumens); see Life Safety Section
			MVOLT	EL55 Emergency battery pack (nominal 390-700 lumens); see Fluorescent Battery Pack Section
			Others available	GLR Internal fast-blow fuse (add X for external)
				GMF Internal slow-blow fuse (add X for external)
				PLF_ Plug-in wiring. Specify 1, 2 or 3 branch circuits & hot wires (A=Black, B=Red, C=Blue, AB or AC)
				TILW Tandem in-line wiring
				PO White porcelain reflector finish
				PAF Paint after fabrication
				SSR Specular silver reflector finish (95% reflective)
				CSA CSA Certified
				NOM NOM Certified

For tandem double-length unit, add prefix T.
Example: TAFPST

Accessories

Order as separate catalog number.

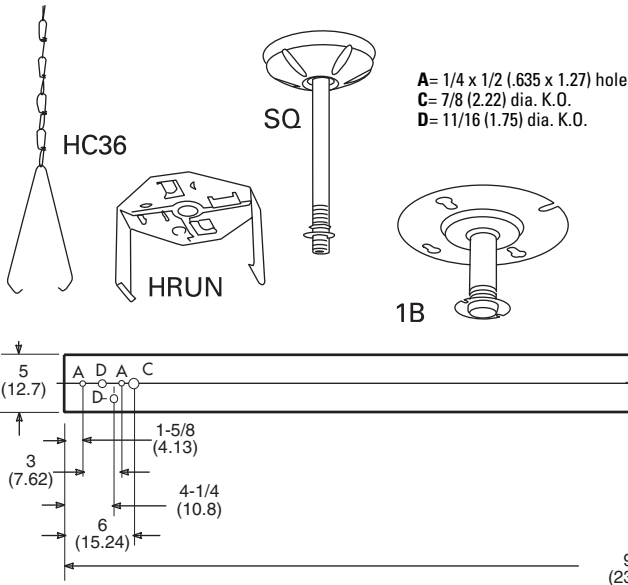
ACEP	Full-depth endplates (1 pair)
HRUN	Hooker® T-bar hanger for 5" channel (flush to ceiling)
HRUN1	Hooker® T-bar hanger for 5" channel (1-1/2" from ceiling)
SQ_	Swivel-stem hanger (specify length in 2" increments)
1B	Ceiling spacer (adjusts from 1-1/2" to 2-1/2" from ceiling)
HC36	Chain hangers (1 pair, 36" long)
THUN	Tong hanger for 5" channel
WGAFPV	Wireguard, 4' white, for AF or PV (order 2 for 8' fixtures)
DLAF ME	4' 30°x 30° metal eggcrate louver (order 2 for 8' fixtures)
DLAF A12	4' framed acrylic prismatic lens, (order 2 for 8' fixtures)

NOTES:
1 T5 and T8 lamps only.

AFP High Output

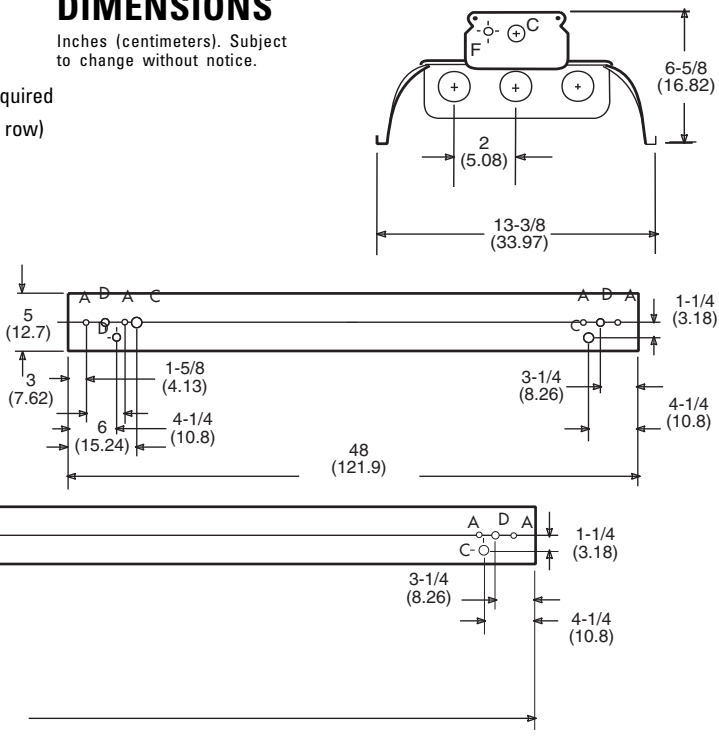
MOUNTING DATA

For unit or row installation. Surface or suspended mounting.
UNIT INSTALLATION — two hanging devices per fixture required
ROW INSTALLATION — one hanging device per fixture plus one per row required
HOOKER® (HRUN) AND HC HANGERS — minimum two per channel (unit and row)



DIMENSIONS

Inches (centimeters). Subject to change without notice.



Cord Set Option:

Add suffix to end of catalog number, specify voltage. All cord sets are 6', black. Other configurations available, consult factory.

Suffix	Description
CS1	Straight plug, 120V
CS3	Twist lock, 120V
CS7	Straight plug, 277V
CS11	Twist-lock, 277V
CS25	Twist-lock, 347V
CS97	Twist-lock, 480V
CS93	600V SO cord, no plug

Energy (Calculated in accordance with NEMA Standard LE-5)

High Output T5

LER.FL	ANNUAL* ENERGY COST	LAMP DESCRIPTION	LAMP LUMENS	BALLAST FACTOR	WATTS
72	\$3.31	F54T5HO	4,450	1	117

*Based on 3000 hrs./year at .08/kwh

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

AFPST 2 54T5HO Test No. LTL 9790

COEFFICIENT OF UTILIZATION										
Ceiling Wall	80%			70%			50%			
	70%	50%	30%	70%	50%	30%	50%	30%	10%	
1	116	116	116	113	113	113	108	108	108	
2	105	100	96	103	98	94	94	91	88	
3	87	76	68	93	85	79	82	76	72	
4	79	67	58	77	66	57	63	56	50	
5	72	60	51	70	58	50	56	49	43	
10	50	37	29	49	36	29	35	28	24	

ZONAL LUMENS SUMMARY			
Zone	Lumens	%Lamp	%Fixture
0-30	2119	23.8	24.5
0-40	3563	40.0	41.2
0-60	6694	75.2	77.5
0-90	8639	97.1	100.0
90-180	0.0	0.0	0.0
0-180	8639	97.1	100.0

AFP 2 54T5HO Test No. LTL 9791

COEFFICIENT OF UTILIZATION										
Ceiling Wall	80%			70%			50%			
	70%	50%	30%	70%	50%	30%	50%	30%	10%	
1	104	99	95	100	96	92	89	86	83	
2	94	86	79	90	83	77	77	72	68	
3	85	75	66	82	72	65	68	61	56	
4	78	66	57	74	64	55	60	53	47	
5	71	58	49	68	56	48	56	46	40	
10	49	36	28	47	35	27	33	26	22	

ZONAL LUMENS SUMMARY			
Zone	Lumens	%Lamp	%Fixture
0-30	1801	20.2	20.6
0-40	3064	34.4	35.1
0-60	5909	66.4	67.6
0-90	7727	86.8	88.4
90-180	1015	11.4	11.6
0-180	8742	98.2	100.0

<p align="center">SWITCHBOARD CDS - 1 (New)</p> <p align="center">1200A, 480/277V, 3 PHASE, 4W, FULL NEUTRAL, 50K A.I.C.</p> <p align="center">LOCATED IN CHILLER ROOM ROOM (180) BUILDING #1</p>
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SECTION	POLES	FRAME	TRIP	FEEDER	NAMEPLATE
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INCOMING		-	-	-	
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SECTION	POLES	FRAME	TRIP	FEEDER	NAMEPLATE	
INCOMING SERVICE SECTION		-	-	-		Maximum Panelboard Capacity 1200 x 80% = 960A
	3	1200A	BUS	3 SETS OF 4#600 KCMIL + #3/0G IN 4"C (EA)	MAIN #1 FEEDS FROM ATS#2A BLDG. 1 RM 171	
1	3	800AF	800AT	2 SETS OF 4#600 KCMIL + #1/0G IN 4"C	MCC1	Motor Loads = Largest Motor x 125% + other motor loads + existing other loads
2 (OPTION 1)	3	800AF	800AT	2 SETS OF 4#600 KCMIL + #1/0G IN 4"C	CHILLER #3 (OPTION # 1)	
2	3	800AF	500AT	4#600 KCMIL + #2G IN 4"C	CHILLER #3	
3	3	800AF	500AT	4#600 KCMIL + #2G IN 4"C	CHILLER #2	(362 x 125%)+328+328+21+ 21+27+27+52+52+65+65+ 124+124+48A = 1734.5A
4	3	800AF	600AT	2 SETS OF 4#300 KCMIL + #2G IN 2 1/2"C (EA)	CHILLER #1	
5	3	40AF	40AT	4#8+10G in 1"C	TVSS	
6	3	30AF	30AT	4#10+10G IN 1"C	(E) 1-RTU-1 (15HP) RETURN FAN	(OPTION 1 = 644.4 X 125% - 328 - 90.5 + 1734.5 = 2120.5A Capacity = 2500A
7	3	30AF	30AT	4#10+10G IN 1"C	(E) 1-RTU-1 (15HP) RETURN FAN	
8	3	225AF	225AT	-	SPARE	
10	3	150AF	150AT	-	SPARE	
						1852.5A

EMERGENCY SWITCHBOARD MDS-2						
2000A, 480/277V, 3 PHASE, 4W, FULL NEUTRAL, 50K A.I.C. (EXISTING)						
LOCATED IN ELECTRICAL ROOM (171A) BUILDING #1						
SECTION	POLES	FRAME	TRIP	FEEDER	NAMEPLATE	
INCOMING SERVICE SECTION		-	-	-		Maximum Panelboard Loads 2000 x 80% = 1600A
	3	2000A	BUS	(E) 6 SET OF 3#500 KCML+#3/0G IN 4"C	FEEDS FROM ATS#2A BLDG. 1 RM 171	
1	3	40AF	40AT	EXISTING FEEDERS AND CONDUITS	SPARE	
2	3	60AF	60AT	4#6+#10G IN 1"C	COOLNG TOWER #3	Existing Load Removed = (100 + 225+400+225) = 760A
3	3	40AF	40AT	4#8+#10 IN 1"C	TVSS	
4	3	60AF	60AT	4#6+#10G IN 1"C	COOLNG TOWER #4 (Alternate #1)	
5	3	60AF	60AT	EXISTING FEEDERS AND CONDUITS	COOLNG TOWER #1	Exisiting Load Remaianing on switchboard = 2000A - 750A = 840A
6	3	60AF	60AT	EXISTING FEEDERS AND CONDUITS	COOLNG TOWER #2	
7	3	125AF	125AT	EXISTING FEEDERS AND CONDUITS	UNKNOWN	
8	3	150AF	150AT	EXISTING FEEDERS AND CONDUITS	X-RAY ROOM 127	Available Panelboard Capacity = 1600A - 840 = 760A
9	3	225AF	225AT	EXISTING FEEDERS AND CONDUITS	ME-1MCC2	
10	3	150AF	150AT	EXISTING FEEDERS AND CONDUITS	SPARE	
11	3	225AF	225AT	EXISTING FEEDERS AND CONDUITS	+	New Cooling Tower Loads 2 x 25 HP Motors = 34 x 2 = 68A
12	3	225AF	225AT	EXISTING FEEDERS AND CONDUITS	SPARE	
13	3	125AF	125AT	EXISTING FEEDERS AND CONDUITS	SPARE (FUTURE EXPANSION)	
14	3	225AF	225AT	EXISTING FEEDERS AND CONDUITS	SPARE	New Switchboard Total Load = 68 + 840 = 908A
15	3	250AF	250AT	-	SPACE	
16	3	400AF	400AT	EXISTING FEEDERS AND CONDUITS	ME-MCC1	
17	3	400AF	400AT	EXISTING FEEDERS AND CONDUITS	X-RAY ROOM 134	908A
18	3	400AF	400AT	EXISTING FEEDERS AND CONDUITS	300 KVA TRANSF. RM 19 (PP7)	
19	3	400AF	400AT	EXISTING FEEDERS AND CONDUITS	X-RAY ROOM 126	
20	3	400AF	400AT	EXISTING FEEDERS AND CONDUITS	SPARE	

NORMAL POWER SWITCHBOARD MDS-2						
800A, 480/277V, 3 PHASE, 4W, FULL NEUTRAL, 50K A.I.C. (EXISTING)						
LOCATED IN ELECTRICAL ROOM (171A) BUILDING #1						
SECTION	POLES	FRAME	TRIP	FEEDER	NAMEPLATE	Maximum Panelboard Available Load
1	3	40AF	40AT	4#8+#10 IN 1"C	ATS #1 Life Safety	
2	3	225AF	225AT	4#4/0+#4 IN 2 1/2"C	ATS #2 Critical Branch	1000 x 80% = 800A
3	3	400AF	400AT	4#600+#3 IN 3 1/2"C	ATS #3 Equipment Branch	New Switchboard Total Load =
4	3	30AF	30AT	4#10+#10 IN 1"C	TVSS	32+180+340 = 552A
						552A

Motor Loads

100

100

40

40

20

20

60

60

75

75

400

800

1570 HP

Project Name

Firm Name CULPEPER VETERANS ASSOCIATES
Date AUGUST 11,2011
Engineer SPENCER I. NEUFELD P.E.

Estimated Available Fault Current Calculator

MAIN	FEEDER	BRANCH
Chiller Room	Main	CDS-1
Secondary Voltage		
	480	
Total System Motor Load (HP)	1570	
Primary Available Fault Current (A)	2,200	
Primary Voltage	12470	
Transformer Rating (kVA)	2000	
Nameplate Transformer Impedance (%Z)	5	
Rated Secondary Current (A) or	2406	
Secondary Available Fault Current (A)	50,000	
Conductor Length (ft.)	25	125
		25
Size of Conductors	600	600
		600
Copper	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Aluminum	<input type="radio"/>	<input type="radio"/>
In Conduit	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Cable	<input type="radio"/>	<input type="radio"/>
Steel	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Non-Magnetic	<input type="radio"/>	<input type="radio"/>
Number of Sets	5	2
		1
Fault Current Available (A)	56,419	36,305
		31,774

NOTE: This program estimates available fault currents for three phase systems. The calculation of motor contribution in this calculator is approximate only - systems with large motor contribution, high X/R conditions, closed transition paralleled sources or high impedance grounding will require a more accurate calculation method. Please see Application Hints for more information.

SIEMENS

Project Name: MECHANICAL EQUIPMENT REPLACEMENT
Engineer: SPENCER I. NEUFELD PE
Date: AUGUST 11, 2011

Panel / Location	Available AIC (A)
CHILLER ROOM 180 MAIN SERVICE BREAKER	56419
CATS-1	36305
CHILLER ROOM 180 CDS-1	31774