Model ID	C0-1003
Date	April 14, 2025
Revision	R1

Disclaimer and Confidentiality Statement

Contents

1. General Notes

Product Description

The pedestal is made up of sheet metal and fasteners which are bent and assembled into the final product. The product is shipped disassembled with the end user required to assemble the final product. The pedestal is designed with interchangeable face plates to allow for installation of third-party chargers with their proprietary mounting patterns. The pedestal does not include cable retraction and requires the cable to be externally mounted.]

Overall Dimensions

This section details the total physical measurements of the assembled components, including length, width, and height, to provide context for spatial requirements and integration constraints.

Description	ISO Value (mm)	US Value (in)
Overall		
Height	1 511	59.5
Depth	279	11.0
Width	305	12.0
Pedestal Without Base Plate		
Height	1 501	59.1
Depth	127	5.0
Width	279	11
Top Cap		
Height	19.1	0.75
Depth	133	5.2
Width	285	11.2
Base Plate		
Height	76.2	3.0
Depth	279	11.0
Width	305	12.0

Summary of Parts

This section provides an overview of all components, including their dimensions in cubic millimeters and corresponding masses calculated.

Part Number	Description
CO-1003 - CO-025-4 CO-025-1	Front Frame Half
CO-1003 - CO-091-3	Bottom Front Cover Plate
CO-1003 - CO-026-3 CO-026-1	Back Frame Half
CO-1003 - CO-027-1	Top Cap
CO-1003 - CO-030-1 CO-011-3 CO-011-1	Base Plate Front Vertical Tab
CO-1003 - CO-030-1 CO-011-4 CO-011-1	Base Plate Back Vertical Tab
CO-1003 - CO-030-1 CO-029-3	Base Plate Horizontal Plate
CO-1003 - CO-042-3	Top Front Cover Plate
CO-1003 - CO-042-4	Top Rear Cover Plate
CO-1003 - CO-086-1	Inner Horizontal Cable Bar

A note for additional clarity - the assembly below does not include all fasteners, all horizontal cable bars, or proprietary mounting plates for chargers. This section considers only the significant components for an overall analysis which will be used in subsequent sections regarding loading and structural performance.

Description	ISO Value (mm^3)	US Value (in^3)	ISO Value (kg)	US Value (lbs)
Front Frame Half	1 106 043.8	67.495	2.9642	6.535
Bottom Front Cover Plate	551 315.6	33.653	1.4775	3.257
Back Frame Half	1 497 518.6	91.408	4.0133	8.847
Top Cap	127 803.7	7.799	0.3425	0.755
Base Plate Front Vertical Tab	144 697.8	8.830	0.3878	0.855
Base Plate Back Vertical Tab	144 697.8	8.830	0.3878	0.855
Base Plate Horizontal Plate	541 428.5	33.040	1.4510	3.199
Top Front Cover Plate	266 817.1	16.287	0.7151	1.576
Top Rear Cover Plate	267 082.3	16.303	0.7158	1.578
Inner Horizontal Cable Bar	11 339.8	0.692	0.0304	0.067
		Total	**12.4854**	**27.524**

Fasteners

The following table below includes all the main frame fasteners and mounting plate fasteners which are used to transfer the loads throughout the pedestal assembly. All fasteners are attached in single shear orientations.

Description	Parameter	ISO Value (mm)	US Value (in)
Top Front Cover Plate	Inner Hole Diameter (Frame)	6.4	0.253
	Outer Hole Diameter (Plate)	5.6	0.221
	Count	6	
	Frame Minimum Fastener Edge Distance	12.7	0.50
	Cover Plate Minimum Fastener Edge Distance	24.6	0.969
Lower Mounting Plate	Inner Hole Diameter (Frame)	6.4	0.253
	Outer Hole Diameter (Plate)	5.6	0.221
	Count	10	
	Frame Minimum Fastener Edge Distance	12.7	0.50
	Cover Plate Minimum Fastener Edge Distance	19.1	0.75
Top Cap	Inner Hole Diameter (Frame)	6.43	0.253
	Outer Hole Diameter (Cap)	6.35	0.250
	Count	4	
	Minimum Fastener Edge Distance	7.76	0.306
Base Plate to Frame	Inner Hole Diameter (Frame)	12.8	0.503
	Outer Hole Diameter (Base Plate Vertical Tab)	10.1	0.397
	Count	4	
	Minimum Fastener Edge Distance	50.8	2.0
Base Plate to Foundation	Hole Diameter	19.1	0.75
	Count	4	
	Minimum Fastener Edge Distance	25.4	1.0

Fastener Capacities

All fastener capacities are based on the minimum hole diameter of the two corresponding pairs, less 1 mm for fitment. Shear and tensile capacities are calculated in accordance with CSA S16-09 Bolts in Bearing Type Connections. The ultimate and yield tensile strength of the fasteners is assumed to be equal to the base sheet metal for simplification.

The following constants and formulas were used in the fastener calculations.

Formula/Constant	Description
$F_y = 300\ MPa$	Yield strength of fastener material
$F_u = 450\ MPa$	Ultimate strength of fastener material
$\varphi_b = 0.8$	Strength reduction factor
$\varphi_{br} = 0.8$	Bearing capacity reduction factor
$V_r = 0.6 \cdot \varphi_b \cdot A_b \cdot F_u$	Factored shear strength
$B_r = 3 \cdot \varphi_{br} \cdot t \cdot d \cdot F_u$	Factored bearing capacity
$V_{r.pin} = 0.66 \cdot \varphi \cdot A \cdot F_y$	Factored shear strength of pin
$T_r = 0.75 \cdot \varphi_b \cdot A_b \cdot F_u$	Factored tensile strength

Please note that the capacities provided below consider only single fasteners and should be compared with factored loads. The V_r term considered the shear capacity of the fastener, B_r considers the bearing resistance of the adjacent metal (i.e. the connection), T_r considers the tensile resistance of the fastener, and $V_{r.pin}$ considers the gross shear capacity of the pin. All fasteners are assumed to be in single shear with threads excluded.

Description	SI Value	US Value	Note
Mounting Plate			
Plate Thickness	2.539 mm	0.1 in	
Fastener Diameter	4.6 mm	0.181 in	
Cross Sectional Area	16.6 mm^2	0.026 in^2	
V_r	1.8 kN	409 lbs	
B_r	6.4 kN	1 427 lbs	
T_r	2.3 kN	511 lbs	
$V_{r.pin}$	1.7 kN	381 lbs	
Top Cap			
Plate Thickness	2.539 mm	0.1 in	
Fastener Diameter	5.35 mm	0.211 in	
Cross Sectional Area	22.5 mm^2	0.026 in^2	
V_r	2.5 kN	553 lbs	
B_r	7.4 kN	1 671 lbs	

T_r	3.1 kN	691 lbs	
$V_{r.pin}$	2.3 kN	515 lbs	
Base Plate to Frame			
Plate Thickness	2.539 mm	0.1 in	Consider only frame thickness since limiting
Fastener Diameter	9.1 mm	0.358 in	
Cross Sectional Area	65 mm^2	0.10 in^2	
V_r	7.1 kN	1 600 lbs	
B_r	12.6 kN	2 842 lbs	
T_r	8.9 kN	2 000 lbs	
$V_{r.pin}$	6.6 kN	1 490 lbs	

Material Properties

The sheet metal material used for the pedestal is 5052-H32 aluminum. This alloy has good workability, good corrosion resistance, high fatigue strength, weldability, and moderate strength.

Description	ISO Value	US Value
Yield Tensile Strength	193 MPa	28 ksi
Ultimate Tensile Strength	228 MPa	33 ksi
Modulus of Elasticity	70.3 GPa	10 200 ksi
Poissons Ratio	0.33	0.33
Shear Modulus	25.9 GPa	3 760 ksi
Shear Strength	138 MPa	20 ksi
Density	2.68 g/cm^3	167.3 lb/ft^3

References

- Metals Handbook, Vol.2 - Properties and Selection: Nonferrous Alloys and Special-Purpose Materials, ASM International 10th Ed. 1990.
- Metals Handbook, Howard E. Boyer and Timothy L. Gall, Eds., American Society for Metals, Materials Park, OH, 1985.
- Structural Alloys Handbook, 1996 edition, John M. (Tim) Holt, Technical Ed; C. Y. Ho, Ed., CINDAS/Purdue University, West Lafayette, IN, 1996.
- Information provided by The Aluminum Association, Inc. from Aluminum Standards and Data 2000 and/or International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys (Revised 2001).

2. Foundation And Base Anchoring Analysis and Design

The following analysis is proposed for the foundation and base design for the EV pedestals. Please note that additional charger manufacturers can be added to this list as this is in no way an exhaustive table.

Manufacturer	Height	Width	Depth	Mass	Note
Grizzl-E Ultimate 48A	260 mm	160 mm	93 mm	9.0 kg	
Tesla Gen 3 Wall Connector 48A Single Phase	345 mm	155 mm	110 mm	4.5 kg	
ChargePoint Homeflex	284 mm	179 mm	132 mm	6.3 kg	
Emporia Classic Smart EV Charger	320 mm	230 mm	86 mm	10.3 kg	
Wallbox Pulsar Plus 48A	201 mm	198 mm	99 mm	4 kg	Weight excludes cable
Juicebox 40	470 mm	173 mm	147 mm	6.8 kg	
Juicebox 48	470 mm	173 mm	147 mm	8.6 kg	
Blink HQ 200	330 mm	241 mm	94 mm	7.7 kg	
Lectron V-Box 48A	450 mm	350 mm	265 mm	9.3 kg	
Autel MaxiCharger 50A	336 mm	187 mm	85 mm	7.0 kg	
Siemens VersiCharge	446 mm	180 mm	178 mm	7.8 kg	
FLO Home X8	409 mm	209 mm	190 mm	10.2 kg	
Rivian Wall Charger	414 mm	185 mm	147 mm	6.4 kg	
Ford Connected Charge Station	595 mm	321 mm	175 mm	11.0 kg	

The following charger manufacturers have provided reference material for their products and are included in this package for reference and cross verification of included values.

Manufacturer	Reference Material
Grizzl-E Ultimate 48A	Yes
Tesla Gen 3 Wall Connector 48A Single Phase	Yes
ChargePoint Homeflex	Yes
Emporia Classic Smart EV Charger	Yes
Wallbox Pulsar Plus 48A	Yes
Juicebox 40	Yes
Juicebox 48	Yes
Blink HQ 200	Yes
Lectron V-Box 48A	Yes
Autel MaxiCharger 50A	Yes
Siemens VersiCharge	Yes
FLO Home X8	Yes
Rivian Wall Charger	Yes
Ford Connected Charge Station	Yes

Based on the above information, the following static analysis of the pedestal is proposed. The charger is applied as a vertical downwards load at ½ the depth of the charger assembly plus ½ the depth of the pedestal. This product yields the specified applied moment from the charger. An appropriate safety factor is applied. The load is assumed to be applied at half of the height of the top mounting plate. This analysis considers the pedestal as a "flagpole" or simple cantilever model. The axial load from the pedestal self weight is considered to be negligible. The applied loads on the pedestal include the load from the charger and the environmental loads. A conservative factor of safety is taken at 2.5:1. Please note that all loads on anchors when comparing to manufacturer specified capacities must be considered as unfactored or specified loads. It is concluded the load applied via self weight from the charger is negligible on the anchorage assembly.

Manufacturer	Force (N)	e, Eccentricity (m)	Applied Moment (Nm)
Grizzl-E Ultimate 48a	88.29	0.047	4.11
Tesla Gen 3 Wall Connector 48a Single Phase	44.15	0.055	2.43
Chargepoint Homeflex	61.80	0.066	4.08
Emporia Classic Smart Ev Charger	101.04	0.043	4.34
Wallbox Pulsar Plus 48a	39.24	0.050	1.94
Juicebox 40	66.71	0.074	4.90
Juicebox 48	84.37	0.074	6.20
Blink HQ 200	75.54	0.047	3.55
Lectron V-Box 48a	91.23	0.133	12.09
Autel Maxicharger 50A	68.67	0.043	2.92
Siemens Versicharge	76.52	0.089	6.81
Flo Home X8	100.06	0.095	9.51
Rivian Wall Charger	62.78	0.074	4.61
Ford Connected Charge Station	107.91	0.088	9.44

Description	ISO Value	US Value
Height Of Pedestal	1 511 mm	59.5 in
Height Of Top Mounting Plate	437 mm	17.2 in
From Top Of Top Mounting Plate To Top Of Top Cap	25.8 mm	1.02 in
Distance From Load To Underside Of Base	1 267 mm	49.9 in
Maximum Charger Moment, Specified	12.09 Nm	8.9 ft lbs
Anchor Spacing, In Direction Of Applied Moment	229 mm	9.02 in
Force Couple On Anchors Pair From Applied Moment, Specified	52.8 N	11.9 lbs
Force Per Anchor From Applied Moment, Specified	26.4 N	5.9 lbs
Force Per Anchor From Applied Moment, Factored	66.0 N	14.8 lbs

Environmental Loads

Continuing analysis of environmental loads for units installed in exterior applications. All environmental loading is provided from the National Building Code of Canada (NBCC) 2020 and considers the following loads:

Description	SI Value	US Value
Station	Vancouver City Hall, British Columbia	
Elevation	40 m	131.2 ft
Latitude	49.26	
Longitude	-123.115	
Wind, 1-In-50 Years	0.45 kPa	9.5 psf
Ground Snow Load	1.8 kPa	37.6 kPa
Rain Load	0.2 kPa	4.2 kPa

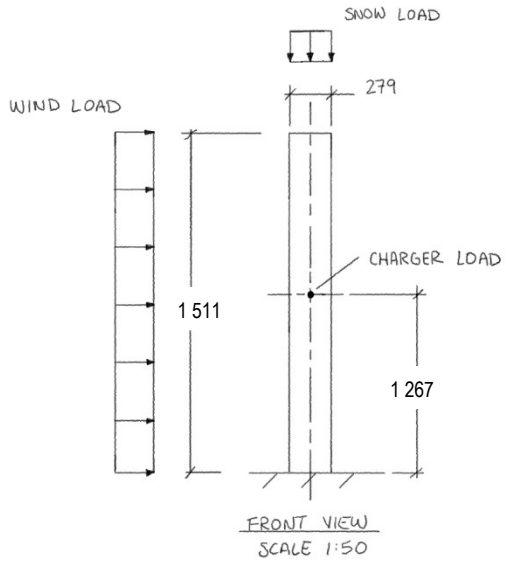
Description	SI Value	US Value
Importance Factor, I_s	1.0	
Wind Exposure Factor, C_w	1.0	
Basic Roof Snow Load Factor, C_b	0.8	
Accumulation Factor, C_a	1.0	
Slope Factor, C_s	1.0	
Snow Load, Specified	1.64 kPa	34.3 kPa
Factor of Safety	1.5	
Snow Load, Factored	2.46 kPa	51.4 psf

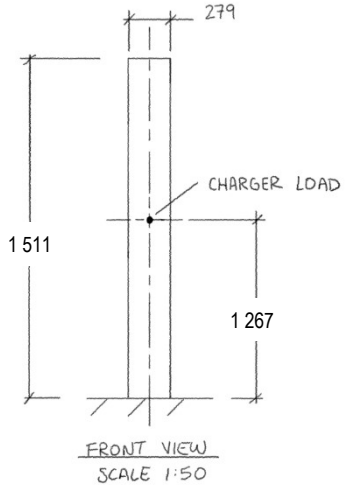
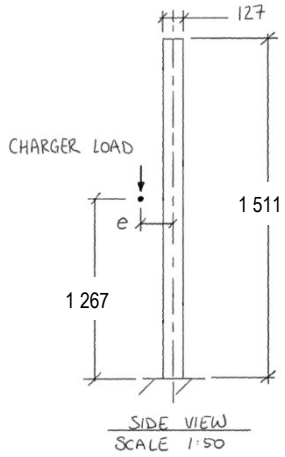
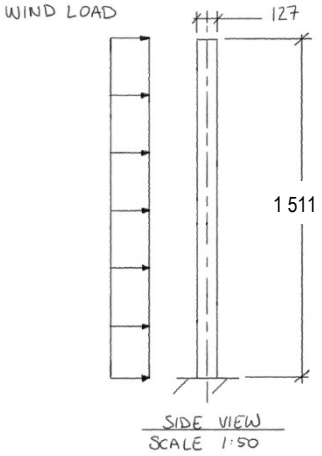
Description	SI Value	US Value
Importance Factor, I_w	1.0	
Exposure Factor, C_e	1.0	
Topographic Factor, C_t	1.0	
Gust Effect Factor, C_g	2.0	
External Pressure Coefficient, C_p	1.0	
Wind Load, Specified	0.9 kPa	18.8 psf
Factor of Safety	1.5	
Wind Load, Factored	1.35 kPa	28.2 psf

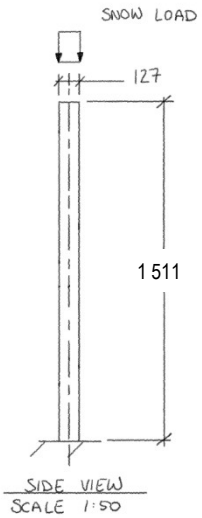
The snow load is assumed to be applied to the top cap of the pedestal acting vertically downwards as a uniformly distributed load (UDL). The wind load is assumed to be applied to the larger side face of the pedestal acting horizontally as a uniformly distributed load (UDL). The equivalent point load is considered by applying the net UDL at the center point of the applied load. No moment is created from the vertical snow load and is considered to be negligible in terms of axial demands. It is concluded the load applied via environmental wind load is negligible on the anchorage assembly.

Description	SI Value	US Value
Plan Cross Sectional Area	35 484 mm^2	55 in^2
Elevation Area (Largest Face)	421 569 mm^2	653.4 in^2
Horizontal Wind Load Applied, Specified	379 N	85.3 lbs
Vertical Snow Load Applied, Specified	58.2 N	13.1 lbs
Equivalent Horizontal Point Load Relative To Underside Of Base Plate	755.5 mm	29.7 in
Equivalent Vertical Point Load	0 mm	0 in
Applied Horizontal Wind Moment, Specified	287 Nm	211 ft lbs
Anchor Spacing, In Direction Of Applied Moment	229 mm	9.02 in
Force Couple On Anchors Pair From Applied Moment, Specified	1 252 N	281 lbs
Force Per Anchor From Applied Moment, Specified	626 N	141 lbs
Force Per Anchor From Applied Moment, Factored	939 N	211 lbs

Further to the discussion above, the following sketches below have been prepared to illustrate the various loading conditions.

Item	Sketch
Global load summary on pedestal	

Simplified view with charger load	
Simplified view with charger load	
Simplified view with wind load	

Simplified view with snow load	

Anchorage

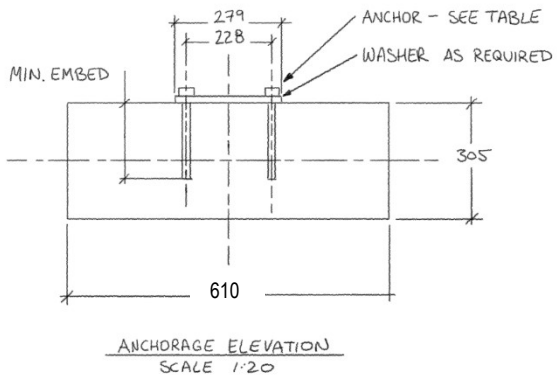
Please note that the Contractor must follow all manufacturer's specifications and instructions for installing any third-party hardware as specified below. Alternatives can be requested by the Contractor for approval and may be approved on a case-by-case basis. The tension and shear capacity strengths provided below assume uncracked, normal density concrete with a minimum 25 MPa 28-day concrete compressive strength. No edge distance reductions, group effect reductions, or cracked concrete conditions are considered below. Additionally, the concrete must have minimum reinforcing as per CSA/ACI standards.

Description	US Tension	ISO Tension	US Shear	ISO Shear
Mechanical Anchors				
HILTI KWIK Bolt TZ2 Wedge Anchor	6 505 lbs	28.9 kN	14 005 lbs	62.3 kN
HILTI KH-EZ Screw Anchor	5 540 lbs	24.6 kN	11 930 lbs	53.1 kN
HILTI HCA Coil Anchor	2 940 lbs	13.1 kN	5 540 lbs	24.6 kN
HILTI KWIK HUS-EZ Screw Anchor	5 540 lbs	24.6 kN	11 930 lbs	53.1 kN
HILTI KWIK BOLT 3 Wedge Anchor SS316	5 285 lbs	23.5 kN	5 495 lbs	24.4 kN
Adhesive Anchors				
HILTI HIT-HY 200-R V3 Adhesive Anchor Epoxy w/ HAS Thread Rod	6 460 lbs	28.7 kN	13 915 lbs	61.9 kN

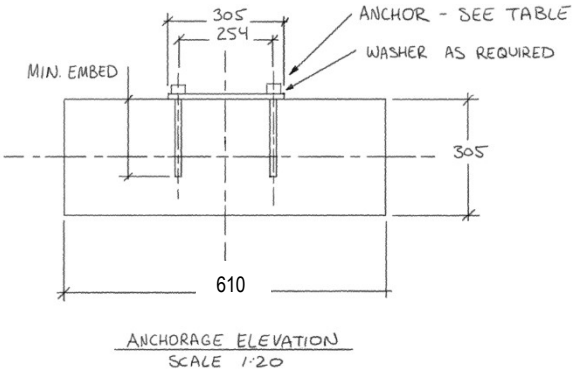
* Allowable loads

Description	Value
Mechanical Anchor A	HILTI KWIK Bolt TZ2 Wedge Anchor
Diameter	¾ in (19.1 mm)
Minimum Nominal Embedment	4” (102 mm)
Mechanical Anchor B	HILTI KH-EZ Screw Anchor
Diameter	¾ in (19.1 mm)
Minimum Nominal Embedment	4 in (102 mm)
Mechanical Anchor C	HILTI HCA Coil Anchor
Diameter	¾” (19.1 mm)
Minimum Nominal Embedment	3-1/4 in (85 mm)
Mechanical Anchor D	HILTI KWIK HUS-EZ Screw Anchor
Diameter	¾ in (19.1 mm)
Minimum Nominal Embedment	4 in (102 mm)
Mechanical Anchor E	HILTI KWIK BOLT 3 Wedge Anchor SS316
Diameter	¾ in (19.1 mm)
Minimum Nominal Embedment	4-3/4 in (121 mm)
Adhesive Anchor A	HILTI HIT-HY 200-R V3 Adhesive Anchor Epoxy
Anchoring Element	HILTI HAS Thread Rod w/ Hex Nut and Flat Washer HILTI HIT-Z Anchor Rod w/ Hex Nut and Flat Washer
Diameter	¾ in (19.1 mm)
Minimum Nominal Embedment	3-1/2 in (89 mm) 4 in (102 mm)

The following details have been prepared regarding the anchors into the concrete slab. For minimum embedment depths, see associated values for chosen anchors.



ANCHORAGE ELEVATION
SCALE 1:20

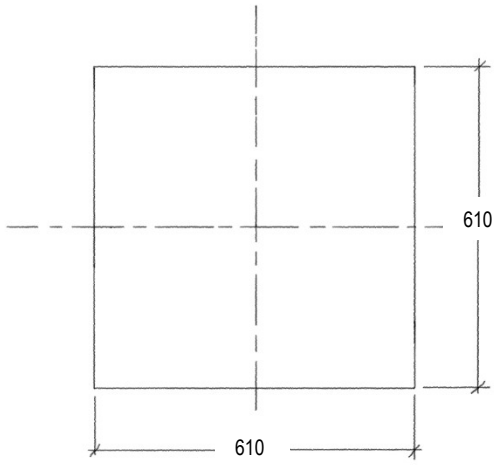


ANCHORAGE ELEVATION
SCALE 1:20

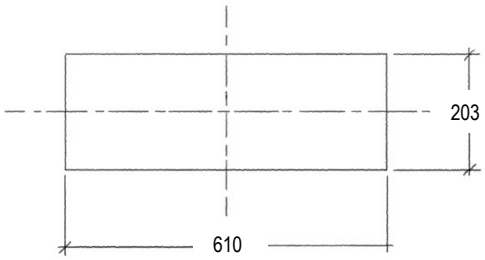
The following requirements regarding the concrete base/foundation below the pedestal is as follows:

Description	**SI Value**	**US Value**
28-day specified concrete compressive strength	25 MPa	4 000 psi
Minimum Slab Thickness	203 mm	8 in
Slab Width	610 mm	24 in
Slab Depth	610 mm	24 in
Exposure Class	C-1	
Concrete Density Type	Normal	
Minimum soil safe working load	150 kPa	3 132 psf
Maximum allowable slab axial load	55.8 kN	12 544 lbs
Reinforcing Steel	10M @ 200 T/B EW	#3 @ 8 in T/B EW
Additional Reinforcing steel notes	• Standard hooks to CSA A23.1 • Steel development lengths as per CSA A23.1 • All steel to f_y=400 MPa • Install corner bars top and bottom – minimum development length 300 mm • Mark bars pre-pour or scan with GOR to post install anchors for pedestal – do not cut bars during anchor installation • No splices permitted – use full length bars • Contractor to vibrate concrete as per CSA A23.1 • All formwork to be responsibility of Contractor • All ground preparation to be responsibility of Contractor – ensure base is graded and prepared before placing reinforcing steel and pouring concrete	

The following details have been prepared regarding the concrete slab for pedestal support: Please note that the pedestal shall be installed at the center point of the slab. Do not eccentrically install the base plate.



CONCRETE SLAB PLAN VIEW
SCALE 1:20



CONCRETE SLAB ELEVATION
SCALE 1:20

3. Static And Overturning Analysis

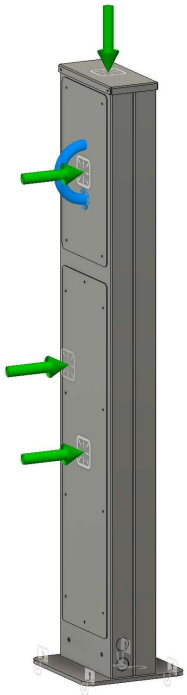
Finite element analysis (FEA) was performed on the entire pedestal assembly to determine more accurately the stress flows and deflections under defined loading conditions. Firstly, the wind loading condition is considered as this yields the largest base moment on the structure. The analysis is followed by the full loading condition on the pedestal with four (4) combinations within the load case. This is to simulate all factored demands on the pedestal and how it behaves. All environmental loads are applied as pressures and the charger load is applied as a concentrated moment for model simplification.

Loading

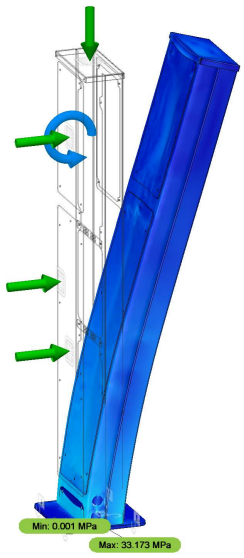
- Vertical snow load, factored 2.46 kPa
- Horizontal wind load, factored 1.35 kPa
- Charger moment, factored 30.25 Nm

Input Model

- Material Al 5052 H32
- All stresses provided are Von Mises stresses which includes resultant demand vectors of all principal axes



Results

Description	SI Value	US Value	
Wind Loading, Factored			
Max Displacement @ Top	0.128 mm	0.01 in	
Max Stress @ Base	18.9 MPa	2 741 psi	
Factor of Safety	10.8:1		
Combination Loading			
Max Displacement	0.532 mm	0.02 in	
Max Stress @ Base	33.2 MPa	4 815 psi	
Factor of Safety	5.03:1		

In conclusion, the pedestal under ordinary and extraordinary loading will not see demands close to its theoretical stress limits. Deflections are well within perceivable limits. The pedestal is rigid and will resist the applied loads adequately given the above listed assumptions and anchorage. Largest stress spikes occur at frame surface interruptions (i.e. holes, openings, etc.) and should be minimized near the base to distribute stresses more evenly and to prevent concentrations. Additional optimizations can be included in the analysis by refining the mesh, manually defining contact surfaces, and refining the load pressure areas. This may result in reduced stress concentrations and ultimately reduce the current demand conditions. Since the current demands are much less than the capacity, there is no need to further refine the input analysis. Additionally, hand checks have yielded very similar results which is important to verify the output from the finite element model (FEA).

4. Base Bracket Installation Procedure

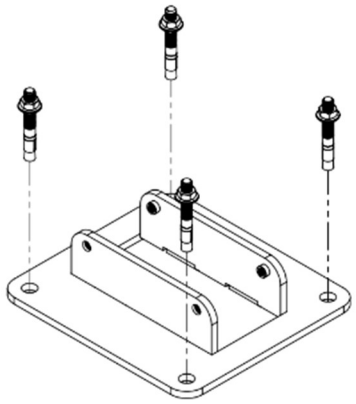
Foundation

- Procedure
    1. Contractor to ensure that the proper foundation/base preparation has been completed
        - For pedestals mounted independently of any structure a base concrete pad is required
            - For example, for pedestals that are installed on soft soils
                - Adjacent to parking lots
                - Commercial properties
                - In residential driveways
                - Etc.
            - Contractor to follow concrete base slab specifications
            - Contractor to cure concrete in accordance with industry best practices and shall provide additional consideration during cold weather pours
            - Contractor to ensure concrete slab compressive strength is reached before post-installing anchors via cylinder compressive tests to be provided at the expense of the Contractor. Cylinder results shall be provided at a minimum for day 3 and day 5, with additional tests at reasonable intervals until cylinder test results show the required minimum concrete compressive strength is reached
            - If ready mix is used, do not add water on site
            - Plasticizers and retarders (i.e. admixtures) may be used as required
        - For pedestals mounted on existing structures, a base pad may not be required to be installed
            - For example, for pedestals installed on existing concrete structures
                - Foundation slabs
                - Garage slabs
                - Approach slabs
                - Etc.
            - If applicable, the engineer of record (EOR) is to review the mounting assembly to their requirement and satisfaction.
            - Otherwise, the Contractor shall review that the base structure is appropriate for mechanical or adhesive anchors
            - Concrete scans shall be performed to identify locations of reinforcing bars prior to post installing anchors to avoid interrupting (i.e. cutting) bars during drilling.

Anchors

- Reference page 7 of Standard Pedestal (CO-1003) Assembly Instruction.pdf
- Contractor to follow all third-party manufacturer's specifications and installation procedures

- Do not interrupt (i.e. cut) into the existing reinforcing steel during anchor installation – mark bars before pouring concrete or GPR scan area to properly identify positions of reinforcing steel



EV pedestal

- Follow page 7 to page 11 Standard Pedestal (CO-1003) Assembly Instruction.pdf for pedestal assembly instructions