| <i>Faci</i> 400 R | lities Development Division v Street. Suite 200, Sacramento, California 95811- | www.oshpd.ca.gov/fdd -6213 Phone (916) 440-8300 Fax (916) 654-2973 |
|----------------------|---|--|
| | | N FOR PREAPPROVAL CATION OF EQUIPMENT AND COMPONENTS |
| | | heck whether application is: NEW RENEWAL X |
| | OSP – 0223-10 | |
| 1.0 | Greenheck Fan Corporation | Brian Mleziva Manufacturer's Technical Representative |
| | | nheck Drive, Schofield, WI 54476 |
| | | Mailing Address |
| | (715) 841-8712 Telephone | Brian.Mleziva@greenheck.com <i>E-mail Address</i> |
| 2.0 | QEI, QEID, and VK-H | Mixed Flow and Lab Exhaust Fans |
| | Product Name | Product Type |
| | | ncluded in this listing: See Certified Product Matrix que product identification numbers and/or serial numbers) |
| | and exhaust fans. All modifications made | uding mixed flow and centrifugal, inline and rooftop, supply to the tested units before and during the tests and nalies observed during the tests shall be incorporated into |
| 3.0 | Greenheck Fan Corporatio | n Tim Kuski |
| | Applicant Company Name | Contact Person |
| | 1100 Gree | nheck Drive, Schofield, WI 54476 |
| | | Mailing Address |
| | 715-355-2232 | Tim.Kuski@Greenheck.com |
| | Telephone | E-mail Address |
| | eby agree to reimburse the Office of s incurred by the department for revie | Statewide Health Planning and Development for the actual ew. |
| | withe Downsky | 11/01/11 |
| | Signature of Applicant | Date |
| | General Manager, CVI | Greenheck Fan Corporation |
| | Title | Company Name |
| | -FDD 759 1 of 3 | State of California – Health and Human Services Agency <i>Edmund G. Brown Jr., Governo</i> Page 1 of 17 |

Office of Statewide Health Planning and Development

pd os



Office of Statewide Health Planning and Development



| Regi | stered Design Professional Prepar | ing the Report | |
|-------------|-------------------------------------|--|--|
| | | ANCO Engineers, Inc. | |
| | | Company Name | |
| | John C. Stoessel | | C 37259 |
| | Contact Name | | alifornia License Number |
| | 1965 | -A 33 rd St., Boulder, CO 80301 | |
| | | Mailing Address | |
| | (818) 591-9001 | john | @ancoengineers.com |
| | Telephone | | E-mail Address |
| Calif | ornia Licensed Structural Enginee | r Review and Acceptance of the | e Report |
| | Tobols | ki Watkins Engineering Inc. | |
| | 100013 | Company Name | |
| | | | |
| | Derrick Watkins Contact Name | | S 5257 |
| | Contact Name | (| California License Number |
| | 3170 Ru | uffin Road, San Diego, CA 92123 | |
| | | Mailing Address | |
| | (858) 381-5843 | dwatki | ns@tobolskiwatkins.com |
| | (000) 301-3043 Telephone | | E-mail Address |
| Anch | orage Pre-Approval | | |
| | | | |
| | Anchorage is pre-approved under (| OPA- | |
| | • • • • • | | |
| | (Separate application for anchorage | e pre-approval is required) | |
| | | | |
| \ge | Anchorage is not Pre-approved | | |
| Certi | fication Method | | |
| \boxtimes | | 🖂 ICC-ES AC-156 | Other (Please Specify): |
| | Testing in accordance with: | A ICC-ES AC-150 | \Box Other (Flease Specify). |
| | | | |
| _ | Analysia | | |
| | Analysis | | |
| | Experience data | | |
| | Combination of Testing, Analysis, a | and/or Experience Data (Please S | pecify): |
| | | | |
| - | | | |
| esti | ng Laboratory (if applicable) | | |
| | ANCO Engineers, Inc. | | Paul Ibanez |
| | Company Name | | Contact Name |
| | 1965-4 | 33 rd Street, Boulder, CO 80301 | |
| | 1900-7 | · · · | |
| | (303)443-7580 x239 | Mailing Address | ul@ancoengineers.com |
| | ζ, , | pat | |
| | Telephone | | E-mail: |
| | | | |
| FDD 1 of | | State of California | - Health and Human Services Age Edmund G. Brown Jr., Go |

osDpd

"Equitable Healthcare Accessibility for California"

Office of Statewide Health Planning and Development



| Approval Parameters | |
|---|--|
| Design in accordance with ASCE 7-05 Chapter 13: 🛛 Yes 🗌 | No |
| Design Basis of Equipment or Components $(F_p/W_p) = 5.1$ (Iso. Floor), 1.7 | (Rigid Curb), 4.1(Hung Iso.) |
| S_{DS} (Spectral response acceleration at short period) = 2.28g | |
| a_p (In-structure equipment or component amplification factor) =2.5 | |
| R_p (Equipment or component response modification factor) = 2.0 (I | so. Floor), 6.0 (Rigid Curb), 2.5 (Hung Iso.) |
| I_p (Importance factor) = 1.5 | |
| z/h (Height factor ratio)= 1.0 | |
| Equipment or Component fundamental period(s) = See UUT Spec | cification and Data Sheets |
| Building period limits (if any) = none | |
| Overall dimensions and weight (or range thereof) =See Certified | Product Matrix |
| Equipment or Components @ grade designed in accordance with ASCE 7 | 7-05 Chapter 15: 🗌 Yes 🔀 No |
| Design Basis of Equipment or Components (V/W) = | |
| S_{DS} (Spectral response acceleration at short period) = | |
| S_1 (Spectral response acceleration at 1 second period) = | |
| R (Response modification coefficient)=1.0 | |
| Ω_0 (System overstrength factor) =1.0 | |
| C_d (Deflection amplification factor) =1.0 | |
| I_p (Importance factor) =1.5 | |
| Height to Center of Gravity above base = | |
| Equipment or Component fundamental period(s) = Sec | |
| Overall dimensions and weight (or range thereof) = | |
| Tank(s) designed in accordance with ASME BPVC, 2007: 🗌 Yes | 🖂 No |
| D List of attachments supporting the special seismic certification of eq | uipment or components: |
| | Certified and Tested Unit Descriptions |
| | Certined and Tested Onit Descriptions |
| OSHPD Approval (For Office Use Only) | December 31, 2016 |
| Signature & Date | Approval Expiration Date |
| M. R. Karim, SHFR | S _{DS} (g) = 2.28 z/h = 1.0 |
| Name & Title Condition of Approval (if any): | Special Seismic Certification Valid Up to |

| | | | Inline Mixed Flow | Fans For Special Seismic Ce | ertification | | | | |
|---------|--------------------|---------------|------------------------------------|--|---------------------------------------|---------|--------|---------|---------|
| Model | Fan Arrangement | Testing Scope | Mounting | Options/Accessories | Level/Construction | Length* | Width* | Height* | Weight* |
| QEI-9 | 9 | Interpolated | | | | 28.5 | 34.7 | 40.25 | 180 |
| QEI-12 | 9 | UUT #9, #6 | | | | 30.13 | 34.7 | 40.25 | 190 |
| QEID-12 | 4 | UUT#7 | | | | 25 | 18.63 | 22.88 | 110 |
| QEI-15 | - | | | | | 31 | 39.2 | 47.63 | 220 |
| QEID-15 | | | | | | 25 | 21.25 | 26.13 | 140 |
| QEI-16 | | | | | | 34 | 41.2 | 50.25 | 250 |
| QEID-16 | | | | | | 26 | 23.75 | 28.5 | 170 |
| QEI-18 | | | | | | 39.5 | 44.2 | 55.13 | 320 |
| QEID-18 | | | | | | 29 | 25.38 | 30.63 | 200 |
| QEI-20 | | | Horizontal Discharge | | | 41.5 | 46.2 | 57.25 | 370 |
| QEID-20 | | | Base Mounted on | | | 34 | 27.13 | 32.75 | 250 |
| QEI-22 | | | Vibration Isolators with | UL-762, UL-705 HT-UL, | | 44 | 49.2 | 59.88 | 430 |
| QEID-22 | | | Motor in Positions A, | sitions A, Construction, Sure-Aire, | Belt & Direct Drive, Class I & II, | 35.5 | 29.38 | 35.38 | 370 |
| QEI-24 | | | C, G (for Arrangement | | | 49 | 53.2 | 66.5 | 550 |
| QEID-24 | | | 9) and Direct Drive | Motor Cover, Mounting | Steel, Spark B & C | 41.5 | 32.63 | 40.13 | 480 |
| QEI-27 | Arr. 4 & 9 | | (Arrangement 4) | Rails, Access Door, Inlet | Resistant | 53 | 56.2 | 69.5 | 680 |
| QEID-27 | (Direct and | Interpolated | | Flange, Outlet Flange, Inlet & Outlet Companion | Construction | 45 | 35.13 | 43 | 570 |
| QEI-30 | Belt Driven) | | Suspended From | Flanges, Belt Tube, Belt | Steel and Aluminum | 60.5 | 68.5 | 77.5 | 1100 |
| QEID-30 | | | Spring Isolators with | Guard, Inlet Guard, Outlet | Wheel, Steel | 50 | 45.63 | 47.88 | 860 |
| QEI-33 | - | | Motor in Positions E, | Guard, Copper Lube Lines, | Housing | 64.5 | 71.5 | 81.5 | 1200 |
| QEID-33 | | | C, and G (for | Extended Life Bearings | 5 | 54 | 49.75 | 51.88 | 1140 |
| QEI-36 | - | | Arrangement 9) and Direct Drive | C C | | 69 | 76.5 | 87 | 1500 |
| QEID-36 | | | (Arrangement 4) | | | 58 | 54.5 | 57.38 | 1360 |
| QEI-40 | | | (Anangement 4) | | | 75.5 | 88.9 | 96 | 2000 |
| QEID-40 | | | | | | 61 | 60.75 | 63.38 | 1650 |
| QEI-44 | | | | | | 80.5 | 95.6 | 104 | 2400 |
| QEID-44 | | | | | | 70 | 66.63 | 69.38 | 2190 |
| QEI-49 | | | | | | 86.5 | 101.6 | 111.5 | 3100 |
| QEID-49 | | | | | | 80.5 | 72.88 | 75.5 | 2700 |
| QEI-54 | 1 | | | | | 93.5 | 109.6 | 121.75 | 3700 |
| QEID-54 | 4 | UUT #10 | 1 | | | 83 | 81.13 | 83.63 | 3130 |
| QEI-60 | 9 | UUT #5, #8 | 1 | | | 102.4 | 117.6 | 126.5 | 4200 |

Special Seismic Certification Certified Product Matrix

Note: Weight is less motor and accessories. Size depends on motor size and location.

| | | | Rooftop Lab Exhau | ust Fans for Special S | eismic Certification | | | | |
|--|--------------------|------------------|--|--|---|----------------------|----------------------------------|------------------------------|-----------------------------|
| Model | Fan Arrangement | Testing Scope | Mounting | Options/Accessories | Level/Construction | Depth* | Max Width* W/ 3X1 plenum | Height* | Weight* W/ 3X1 plenum |
| VK-H 9 | | UUT 4 | | UL/cUL-705, UL- | | 39 | 75.38 | 146 | 954 |
| VK-H 10 VK-H 12 VK-H 13 VK-H 16 | | Interpolated | | 762, Fan Outlet Nozzle, Attenuating Outlet Nozzle, Access Door, Motor | | 39 39 42 47 | 75.38 75.38 81.38 93.38 | 146 146 146.5 146.5 | 954 954 1052 1217 |
| VK-H 18 | | UUT 3 | Vertical Upblast Fan | Cover, Bearing Cover, Stack Extension, Sure- Aire, Bypass Air | Belt drive Class II Arrangement 9 | 53 | 111.38 | 146 | 1517 |
| VK-H 22 | - | | Rigid Base Mounted | | | 60 | 129.38 | 145.25 | 1865 |
| VK-H 24 | | Interpolated | on Roof Curb | | | 68 | 147.38 | 146 | 2268 |
| VK-H 30 | | | | Plenum, Isolation | Spark B | 74 | 165.38 | 155.5 | 2719 |
| VK-H 36 | 9 | UUT 1 & 2 | Bypass Air Plenum Configurations 1x1 2x1 3x1 | Damper, Bypass Damper, Bypass Damper Weatherhood, Bypass Damper Attenuating Weatherhood, Damper Actuators, Disconnect Switches, Roof Curb | Resistance Construction Aluminum Wheel Steel Housing | 82 | 183.38 | 167 | 3336 |

Note: Weight is less motor and accessories. Size depends on motor size and location.

| Greenheck Model Line | Motor Manufacturer | Weight (lbs) | HP | Voltage | Drive | Comment | UUT | | | | |
|----------------------------|-----------------------|--------------|-----|-------------|--------|-------------------------|-----|--|--|--|--|
| | | 13 | 1/3 | 110V-575V | any | Smallest | | | | | |
| | WEG | | | | | | | | | | |
| | | 1302 | 100 | 208/230/460 | Belt | Largest | 5,8 | | | | |
| | | 20 | 1/3 | 110V-575V | any | Smallest | | | | | |
| Mixed Flow (QEI & QEID) | | 89 | 7.5 | 208/230/460 | Belt | Largest on Small Fan | 6,9 | | | | |
| | Baldor | 99 | 5 | 208/230/460 | Direct | Largest on Small Fan | 7 | | | | |
| | | | | | | · | | | | | |
| | | 1350 | 100 | 110V-575V | any | Largest | | | | | |
| - | Marathon Electric | 14 | 1/3 | 110V-575V | any | Smallest | | | | | |
| | | | | | | | | | | | |
| | | 1400 | 100 | 460V | Direct | Largest | 10 | | | | |
| | WEG | 20 | .75 | 110V-575V | | Smallest | | | | | |
| | | | | | | | | | | | |
| | | 499 | 20 | 208/230/460 | Belt | Largest | 1&2 | | | | |
| | | 23 | .75 | 110V-575V | Belt | Smallest | | | | | |
| Lab Exhaust | Baldor | 57 | 2 | 208/230/460 | Belt | Largest on Small Fan | 4 | | | | |
| | | | | | | | | | | | |
| (Vektor-H) | | 492 | 20 | 208/230/460 | Belt | Largest | 1 | | | | |
| | | 20 | .75 | 110V-575V | Belt | Smallest | | | | | |
| | Marathon Electric | 123 | 5 | 208/230/460 | Belt | Largest on Small Fan | 3 | | | | |
| | Electric | | | | | | | | | | |
| | | 500 | 20 | 230/460 | Belt | Largest | 1 | | | | |

All motors are available in voltages ranging from 110V to 575V based upon customer request.

| Item | Unit # | Max Depth (X) [in] | Max Width (Y) [in] | Max Height (Z) [in] ^ª | Item Weight [Ibs] | CG [in] ^b | Mounting |
|------|---------------------|--------------------------|--------------------------|-------------------------------------|-------------------------|----------------------|---------------------------|
| | | V | ektor-H La | b Exhaust Fans | ; | 1 | |
| | | | | | | 91.42324 | |
| 1 | VK-H-36-A200-X-3x1 | 184 | 87 | 145.5 | 6038 | 37.94056 | Curb Mount |
| | | | | | | 61.70495 | |
| | | | | | | 28.8 | |
| 2 | VK-H-36-X1 | 58.25 | 106 | 145 | 2321 | 43.15 | Curb Mount |
| | | | | | | 65.35 | |
| | VK-H-18-A50-UL762- | | | | | 16.9 | |
| 3 | 1x1 | 38.5 | 48.25 | 124.5 | 667 | 21.2 | Curb Mount |
| | | | | | | 36.3 | |
| | | | | | | 11.4 | |
| 4 | VK-H-9-M20-X-1x1 | 27 | 32.5 | 123.5 | 363 | 14.8 | Curb Mount |
| | | | | | | 29.6 | |
| | | Mixe | d Flow Inlin | ne Ventilation | Fans | | |
| _ | | 100 | | | | 53.76233 | Spring isolated |
| 5 | QEI-60-II-1000-HTUL | 106 | 117.5 | 101 | 5678 | 53.62883 | direct |
| | | | | | | 53.45892 | |
| 6 | | 20.5 | 20.25 | 26.25 | 250 | 14.375 | suspended spring |
| 6 | QEI-12-I-75-G | 30.5 | 20.25 | 36.25 | 250 | 10 | iso |
| | | | | | | 23.75 | |
| 7 | QEID-12-50-M50-X | 31.25 | 20.25 | 22.25 | 199 | 13.25 10.125 | suspended spring |
| / | QLID-12-30-10130-X | 51.25 | 20.25 | 22.25 | 155 | 13.325 | iso |
| | | | | | | 53.76233 | |
| 8 | QEI-60-II-1000-HTUL | 106 | 117.5 | 101 | 5678 | 53.62883 | suspended spring |
| | | | | | | 53.45892 | iso |
| | | | | | | 14.375 | |
| 9 | | 00 F | ••• • • | | | 10 | spring isolated |
| | QEI-12-I-75-G | 30.5 | 20.25 | 36.25 | 250 | 23.75 | direct |
| | | | | | | 37.95888 | |
| 10 | QEID-54-75-C1000 | 86.5 | 82 | 80 | 4350 | 40.47299 37.19003 | spring isolated direct |

UUT Specification and Data Sheets

a) Curb height not included

b) 1^{st} line = depth, 2^{nd} line = width, 3^{rd} line = height

| וטט | Γ# | 1 |
|---------|----|----|
| / . | | -/ |

ANCO Engineers, Inc. 1965A 33rd Street Boulder, CO 80301 (303)443-7580

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

| | And The Section Sectio |
|---------------|--|
| Manufacturer: | Greenheck Fan Corporation (Schofield, WI, USA) |
| Model Line: | Vektor-H Lab Exhaust Fans |
| Model Number: | VK-H-36-A200-X-3x1 |
| Product | Three VK-H-36-A200-X fans with standard nozzle cones mounted on a VK-H-36-A200-X- |
| Construction | 3x1 bypass air plenum which was then mounted on a 3 piece VKCURB-56.63/182.44- |
| Summary: | S24 Curb mounted on a W8x15 steel I-beam base. Aluminum wheel, Steel Housing, |
| | Arrangement 9. |
| Options/ | Each fan had a Fan Outlet Nozzle, Access Door, motor cover, bearing cover, 3X1 bypass |
| Subcomponent | air plenum, disconnect switch, Spark B BISW wheel, isolation damper (controlled), |
| Summary: | isolation damper actuator, Bypass damper (controlled), bypass damper actuator, drain |
| | connection, weatherhood (2 full size and one just for the actuator), and 2 of the 3 fans |
| | had a bypass air damper in the weatherhood. Fan 1: Baldor, 20Hp, 460/230/208V; Fan |
| | 2: Marathon, 20Hp, 460/230V; Fan 3: WEG, 20Hp, 460/230/208V. Belt Drive. |
| | UL Listing: UL/cUL-705 |
| | UIIT Properties |

| | our properties | | | | | | | | | |
|-------------|-----------------|-------|--------|-------------------------------|-------------|--------------|--|--|--|--|
| Weight (lb) | Dimensions (in) | | | Lowest Natural Frequency (Hz) | | | | | | |
| | Depth | Width | Height | Front-Back | Side-Side | Vertical | | | | |
| 6038 | 184 | 87 | 145.5 | Fan 1; 7.1, | Fan 1; 7.9, | Fan 1; 15.0, | | | | |
| | | | | Fan 2; 7.1, | Fan 2; 7.8, | Fan 2; 15.6, | | | | |
| | | | | Fan.3; 7.1 | Fan.3; 7.8 | Fan.3; 15.3 | | | | |

UUT Highest Passed Seismic Run Information

| oor mynestr usseu seisine nun mjormution | | | | | | | | | | |
|--|---------------|-----------------|-----|----------------|--------------------|--------------------|--------------------|--------------------|--|--|
| Building Code | Test Criteria | S _{DS} | z/h | I _P | A _{FLX-H} | A _{RIG-H} | A _{FLX-V} | A _{RIG-V} | | |
| CBC 2010 | ICC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3.65 | 2.74 | 2.44 | 1.83 | | |
| | | | | | | | | | | |

Test Mounting Details:



The unit was anchored using fasteners centered on the 5" curb flange with 7.5" center to center between screws. 5/16"-24 Dril-Flex Self Drilling/Tapping Screws with 3/16" Min. thread engagement into A36 steel with 5/8" min. edge distance were used.

Form: UUT, revision 0.0

| ۸NC | O Enginee | | | | | | JUT | | |
|----------------------------------|------------------|------------------------|----------|----------------|--------------|--------------------|-------------------|-------|--------------------|
| | | rs, Inc. | | Uni | it Und | er Te | st (Ul | JT) | |
| 1965A 33rd Str Boulder, CO 80 | | | | | Summ | arv 9 | Sheet | | |
| (303)443-7580 | 501 | | | | Jumm | | | Num | DOR: 2200 0E |
| Manufacturer: | Greenbeck | an Corn | oration | (Schofield, V | νι μεδ) | ANC | O Project | NUIII | ber: 3298.05 |
| Model Line: | Vektor-H La | | | | vi, 03Aj | | | | |
| Model Number | | | | | | | | | |
| Product | | | | th attenuatir | ng nozzle co | ne mour | nted on a \ | /K-H- | 36-X1 |
| Construction | | | | as then mour | - | | | | |
| Summary: | ••• | | | luminum Wh | | | | | |
| Options/ | | | | utlet Nozzle, | | | | | cover, 1x1 |
| Subcomponent | | | - | nnection, By | | | | - | |
| Summary: Disconnect Switches, | | | | | • • | | - | | |
| • | I | | | IUT Propertie | | • * | • | | |
| Weight (lb) | Dimensions (in) | | | • | Lowest I | Natural F | requency | (Hz) | |
| - | Depth | Width | | Height | Front-Ba | ick S | ide-Side | \ | /ertical |
| 2321 | 58.25 | 106 | | 145 | 4.0 | 5 | .0 | 1 | .4.4 |
| | l | JUT High | nest Pas | ssed Seismic | Run Inform | ation | | | |
| Building Code | Test Criteria | S _{DS} | z/h | I _P | A_{FLX-H} | A _{RIG-H} | A _{FLX-} | v | A _{RIG-V} |
| CBC 2010 | ICC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3.65 | 2.74 | 2.44 | | 1.83 |
| Test Mounting | | | | | | | | | 7 9 |

The unit was anchored using fasteners centered on the 5" curb flange with 7.5" center to center between screws. 5/16"-24 Dril-Flex Self Drilling/Tapping Screws with 3/16" Min. thread engagement into A36 steel with 5/8" min. edge distance were used.

Form: UUT, revision 0.0

| ANC | | | ers, Inc. | | Ur | nit | Unde | er T | | JT # (יטט | | | |
|----------------------------------|------|---------------|------------------------|--|----------------|-------|--------------------|-------------------------|--------------------------|---------------------|----------|--------------------|--|
| 1965A 33rd Str Boulder, CO 80 | | | | Summary Sheet | | | | | | | | | |
| (303)443-7580 | | | | ANCO Project Number: 3298.05 | | | | | | | | | |
| Manufacturer: | | Greenheck | Fan Corpo | oratio | n (Schofield, | WI | , USA) | | | | | | |
| Model Line: | | Vektor-H La | b Exhaus | t Fans | | | | | | | | | |
| Model Numbe | r: | VK-H-18-A5 | 0-UL762- | 1x1 | | | | | | | | | |
| Product | | One VK-H-1 | 8-A50-UL | .762-1x1 fan with standard nozzle cone mounted on a bypass air | | | | | | | | | |
| Construction | | plenum whi | ich was th | nen me | ounted on a | GP | FHLV33-G | 18 Cu | rb moւ | unted to v | woo | od decking | |
| Summary: | | on the shak | e table. A | Aluminum wheel, steel housing, Arrangement 9. Iozzle, Access Door, Motor Cover, Bearing Cover, Stack Extension, | | | | | | | | | |
| Options/ | | UL-762, Fan | Outlet N | ozzle, | Access Doo | r, N | lotor Cove | er, Bea | aring C | over, Sta | ck E | xtension, | |
| Subcomponen | t | 1x1 Bypass | Air Plenu | m, dra | in connectio | on, I | Disconnec | t Swit | ches, 2 | 18" Roof | Cur | b (Vented), | |
| Summary: | | Motor: Mar | athon Ele | ectric, | 5Hp, 460/23 | 30/2 | 208V. Belt | Drive | • | | | | |
| | | | | | UUT Proper | ties | | | | | | | |
| Weight (lb) | Di | mensions (in |) | | Lowest | | | | t Natural Frequency (Hz) | | | | |
| | De | epth | Width | | Height | | Front-Ba | ck | Side-Side | | Vertical | | |
| 667 | 38 | - | 48.25 | | 124.5 | | 5.0 | | 4.0 | | 1 | 5.0 | |
| | | | | | issed Seismi | 1 | - | ation | | | | T | |
| Building Code | | Test Criteria | S _{DS} | z/h | I _P | | A _{FLX-H} | A _{RIG} | | A _{FLX-V} | | A _{RIG-V} | |
| CBC 2010 | | CC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3 | 3.65 | 2.74 | ł | 2.44 | | 1.83 | |
| Test Mounting | ; De | tails: | | | | | | | | | | | |
| | | | | | | | | | | | | | |

The unit was anchored using eight 3/8" wood lag screws per side through the curb flange into 4x4 backing lumber.

Form: UUT, revision 0.0

04

| | | | | UUT # 4 Unit Under Test (UUT) | | | | | | | | | |
|---------------------------------|----------------|-----------------|--|----------------------------------|-------|------------------------------------|--------|--------------------------|--------------|--------------------|--|--|--|
| | | ers, Inc. | | Ur | nit | : Unde | er 1 | Test | (UU) | Г) | | | |
| 1965A 33rd Str | | | | | C | umm | 25 | , Ch | oot | - | | | |
| Boulder, CO 80 (303)443-7580 | | | Summary Sheet | | | | | | | | | | |
| | 1 | | ANCO Project Number: 3298.05 pration (Schofield, WI, USA) | | | | | | | | | | |
| Manufacturer: | | • | | • | , WI | , USA) | | | | | | | |
| Model Line: | Vektor-H La | | t Fans | | | | | | | | | | |
| Model Numbe | - | - | | h standard . | | | | | | 1 C12 Curb | | | |
| Product Construction | | | | h standard r on the shak | | | | | | | | | |
| Summary: | Arrangeme | | ecking | on the shak | le la | ible. Alum | mum | wneel | , steel no | usilig, | | | |
| Options/ | | | | zzle, Access | | or Motor | Cove | r Roor | ing cover | drain | | | |
| Subcomponen | - | - | | - | | - | | | • | nnect Switch, | | | |
| Summary: | | | | dor, 2Hp, 46 | - | | • | • | (y), Disco | | | | |
| <u> </u> | 12 11001 0 | | | UUT Proper | | | | | | | | | |
| Weight (lb) | Dimensions (ir | n) | | | | | Vatura | al Fred | uency (H | z) | | | |
| | Depth | Width | | | | Front-Back | | Side | Vertical | | | | |
| 363 | 27 | 32.5 | | 123.5 | | 4.1 4 | | 4.1 | | 11.1 | | | |
| | | UUT High | nest Pa | assed Seism | ic R | un Inform | ation | | | | | | |
| Building Code | Test Criteria | S _{DS} | z/h | Ι _Ρ | | A _{FLX-H} A _{RI} | | RIG-H A _{FLX-V} | | A _{RIG-V} | | | |
| CBC 2010 | ICC-ES AC-156 | 2.28 | 1.0 | 1.5 | | 3.65 | 2.74 | 1 | 2.44 | 1.83 | | | |
| Test Mounting | Details: | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

The unit was anchored using four 3/8" wood lag screws per side through the curb flange into 4x4 backing lumber.

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| | | ers, Inc. | | Un | it | : Unde | er 1 | | JT # (יטט | | | |
|-------------------------------------|-----------------|-------------|-------------------|---|------------|----------------------------------|----------------------------|----------|---------------------|-----|--------------------|--|
| 1965A 33rd Sti Boulder, CO 80 | | | | Summary Sheet | | | | | | | | |
| (303)443-7580 | | | | | Ŭ | | - | | | ımh | er: 3298.05 | |
| Manufacturer | Greenheck | Fan Corp | oratior | n (Schofield, | W | , USA) | ,, | | ojectiva | | ci. 5250.05 | |
| Model Line: | Mixed Flow | w Inline Ve | entilatio | on Fans | | | | | | | | |
| Model Numbe | r: QEI-60-II-1 | .000-HTUL | - | | | | | | | | | |
| Product | Belt drive | Mixed Flov | w Inline | e fan base m | ou | nted on a | struct | tural ba | ase on se | ism | ic spring | |
| Construction Summary: | isolators w | in Pos | ition G. Stee | ۱w | heel, stee | l hous | ing, Ar | rangeme | ent 9 |). | | |
| Options/ Subcomponen Summary: | | Base, Inle | t Guarc Drive. | , Extended Li d, Outlet Gua | ard | , Seismic F | | | | | | |
| | | | l | UUT Propert | ies | | | | | | | |
| Weight (lb) | Dimensions (i | | | Lowest Natur | | | - | | - T | | | |
| | Depth | Width | | V | | Front-Ba | ck | Side- | Side | - | ertical | |
| 5678 | 106 | 117.5 | hast De | 101 2.6 est Passed Seismic Run Informati | | ation | 3.2 | | 6. | 9 | | |
| Building Code | Test Criteria | - | z/h | | 1 | ан ттјоттт А _{ғіх-н} | T | | A _{FLX-V} | | A _{RIG-V} | |
| CBC 2010 | ICC-ES AC-156 | 55 | 1.0 | 1.5 | | 4.76 | А _{кід-н} 3.58 | | 3.17 | | 2.36 | |
| Test Mounting | Anchored to for | | SH-1E-2 | | | | | | a grada | 85 | /8"-11 holt | |
| | | | | r (one of eac | | - | | | ie graue | 55 | -11 DOIL | |

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| ANC | | eers, Inc. | | Uni | it | Unde | er T | | JT # (יטט) | | |
|----------------------------------|----------------|---------------|---------------|-----------------|----------|-----------------------------|--------|---------------------------------------|----------------------|--------------------|--|
| 1965A 33rd Str Boulder, CO 80 | | | Summary Sheet | | | | | | | | |
| (303)443-7580 | | | | | | ••••• | - | | | mber: 3298.05 | |
| Manufacturer | Greenheo | k Fan Corp | oratio | n (Schofield, V | VI, | , USA) | | | , | | |
| Model Line: | Mixed Flo | w Inline Ve | ntilati | on Fans | | | | | | | |
| Model Numbe | r: QEI-12-I-7 | 75-G | | | | | | | | | |
| Product | Belt drive | Mixed Flow | v Inlin | e fan suspend | lec | d from seis | smic s | spring i | solators | with motor in | |
| Construction | Position E | | | | | | | | | | |
| Summary: | | norte D. D.a! | atourt 1 | Construction - | C | ank C Da-! | ot 0 + | Const | untion D | altad Access | |
| Options/ | | | | Construction, | | | | | | | |
| Subcomponen | | tor Cover, l | - | | et | Companie | | inge, C | opper Lu | be Lines, Belt | |
| Summary: | Tube, Nic | tor cover, i | | | ~~ | | | | | | |
| Weight (lb) | Dimensions | :m) | | UUT Propertie | 25 | Lowest N | latur | | uonay (U | -) | |
| weight (ib) | Depth | Width | Height | | | Lowest Natura Front-Back | | Side- | | Vertical | |
| 250 | 30.5 | 20.25 | | 36.25 | N/A | | CK | N/A | | N/A | |
| 230 | 50.5 | | nest Pr | | Rı | Run Information | | | | | |
| Building Code | Test Criteri | | - | | 1 | - | | A _{RIG-H} A _{FLX-V} | | A _{RIG-V} | |
| CBC 2010 | ICC-ES AC-15 | 5 | 1.0 | 1.5 | | 3.65 2. | | | 2.44 | 1.83 | |
| | as anchored to | | | | | | | | | | |
| | revision 0.0 | b" long and | l was a | also restraine | dk | by four VN | VIC SE | -250 si | - | age 1 of 2 | |

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| ANC | X | Enginee | ers, Inc. | | Uni | t Unde | er T | | JT # (UU ⁻ | | | |
|---|-------|--|---|---|---|--|-------------------------|---------|--------------------------|--------------------|--|--|
| 1965A 33rd St Boulder, CO 80 (303)443-7580 | 0301 | | | Summary Sheet ANCO Project Number: 3298.05 | | | | | | | | |
| Manufacturer | : 0 | Greenheck | Fan Corpo | oratio | n (Schofield, V | /I, USA) | | | | | | |
| Model Line: | Ν | Mixed Flow | Inline Ve | ntilati | on Fans | | | | | | | |
| Model Numbe | er: C | QEID-12-50 | -M50-X | | | | | | | | | |
| Product Construction Summary: | | Direct drive | Mixed Fl | ow Inl | ine fan susper | ided from s | eismi | c sprin | g isolatoı | rs. | | |
| Options/ | В | Bolted Acce | ess Door, l | Univer | sal Mounting | System, UL | /cUL- | 705, Su | re Aire F | low probes, | | |
| Subcomponer Summary: | nt E | Extended N | lotor Wiri | ing. | | • | | | | | | |
| | | | | | UUT Propertie | s | | | | | | |
| Weight (lb) | Dime | ensions (in | | | | Lowest N | latura | l Freq | uency (H | | | |
| | Dept | | Width | | Height | Front-Ba | ck | Side- | Side | Vertical | | |
| 199 | 31.25 | - | 20.25 | | 22.25 | N/A | | N/A | | N/A | | |
| | | | - | | issed Seismic | 2 | r | | T | | | |
| Building Code | | st Criteria | S _{DS} | z/h | I _P | A _{FLX-H} | A _{RIG} | | A _{FLX-V} | A _{RIG-V} | | |
| CBC 2010 | ICC | C-ES AC-156 | 2.28 | 1.0 | 1.5 | 3.65 | 2.74 | | 2.44 | 1.83 | | |
| JAF SUPPORT BOS TO STRUCTURE TO CRUMO ATTACHMENT THE WIC CROUP STRUCTUREL C CHAINEL THE WIC CROUP STRUCTUREL C CHAINEL | | MC EDICS MC | KO STITTER S GROUP DON HANGER KA KA KA | The u ceiling IRS-1D ¾"-10 ong ar | unting Details nit was ancho g fixture using 0-120 spring h threaded rod nd was also re MC SB-250 sw kits. | red to the four VMC angers with cut to 26" strained by | | | | | | |

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| ANC | 7 | Denging | ors Inc | | UUT # 8 Unit Under Test (UUT) | | | | | | | | |
|---|-------------|---------------|-----------------|--------|----------------------------------|--------|--------------------|------------------|-----------|--------------------|--------------------|--|--|
| 1965A 33rd St | | | ers, inc. | | | | | | | | | | |
| Boulder, CO 80 | | | | | Summary Sheet | | | | | | | | |
| (303)443-7580 | | - | | | | | a | - | | | ımber: 3298.05 | | |
| Manufacturer | | Greenheck | Fan Corn | oratio | n (Schofield | W/I | USA) | | | | 111001. 3238.03 | | |
| Model Line: | - | Mixed Flov | | | | , | ,, | | | | | | |
| Model Numbe | er: | QEI-60-II-1 | | | | | | | | | | | |
| Product Belt drive Mixed Flow | | | | | e fan Suspe | nde | d mounte | ed fror | n a stru | uctural ba | ase on seismic | | |
| Construction spring isolators with | | | | | • | | | | | | | | |
| Summary: | | | | | | | | | | | | | |
| Options/ | | HT-UL, Bol | ted Acces | s Door | , Extended I | Life | Bearings | L(10)-2 | 200K, E | elt Tube | , Structural | | |
| Subcomponen | Base, Inlet | utlet G | Juard, Seism | nic Fl | lange We | lds, M | otor: V | VEG, 100 | Нр, | | | | |
| Summary: | | 460/230/2 | 08V. Belt | Drive. | | | | | | | | | |
| | | | | | UUT Proper | rties | | | | | | | |
| Weight (lb) | Di | mensions (ii | | | Lowest Natural Frequency | | | | | | z) | | |
| | De | epth | Width | | Height | | Front-Back | | Side-Side | | Vertical | | |
| 5678 | 10 | 6 | 117.5 | | 101 | | N/A | | N/A | | N/A | | |
| | | | | | assed Seism | ic R | un Inforn | 1 | 1 | | | | |
| Building Code | | Test Criteria | S _{DS} | z/h | I _P | | A _{FLX-H} | A _{RIG} | | A _{FLX-V} | A _{RIG-V} | | |
| CBC 2010 | | CC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3 | 3.65 | 2.74 | 1 | 1.53 | 0.62 | | |
| Test Mounting | | | | | | | | | | | | | |

The unit was anchored to the ceiling fixture using four Mason RW30N-D-2150 spring hangers with ³/₄"-10 threaded rod cut to 26" long and was also restrained by four SCB-4 sway bracing kits with 3/8" diameter Steel Aircraft Cable.

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| ANC | X | DEngine | ers. Inc. | | 11 | .:. | مماد | | | JT # | | |
|----------------------|------------|--------------|------------------------|------------------------------|----------------|-------|--------------------|-----------|--------------|--------------------|--------------------|--|
| 1965A 33rd St | | | | Unit Under Test (UUT) | | | | | | | | |
| Boulder, CO 80 | | | | Summary Sheet | | | | | | | | |
| (303)443-7580 | | | | ANCO Project Number: 3298.05 | | | | | | | | |
| Manufacturer | | Greenheck | Fan Corpo | oratio | n (Schofield, | wi | . USA) | | | ojectiva | 111501: 5250.05 | |
| Model Line: | - | Mixed Flow | • | | • | , | , , | | | | | |
| Model Numbe | r: | QEI-12-I-75 | -G | | | | | | | | | |
| Product | | Belt drive N | /lixed Flov | v Inlin | e fan, base r | nou | inted on se | eismi | c spring | g isolator | s with motor | |
| Construction | | in Position | A. Alumin | um w | heel, Steel h | ous | ing with al | umin | um inle | et cone, / | Arrangement | |
| Summary: | | | | | | | | | | | | |
| Options/ | ark B Resi | stant (| Construction | , Sp | ark C Resi | stant | Constr | uction, B | olted Access | | | |
| Subcomponen | t | Door, Inlet | & Outlet I | Flange | e, Inlet & Out | tlet | Companio | n Fla | nge, Co | opper Lub | oe Lines, Belt | |
| Summary: | | Tube, Moto | or Cover, I | Drain (| Connection, | Mo | tor: Baldo | r, 7.5I | Hp, 460 |)/230/20 | 8V. Belt Drive. | |
| | | | | | UUT Propert | ties | | | | | | |
| Weight (lb) | | mensions (in | | | | | Lowest N | | · · · | | | |
| | | epth | Width | | Height | | Front-Back | | ck Side-Si | | Vertical | |
| 250 | 30 | | 20.25 | | 36.25 | | 5.2 | | 7.2 | | 16.2 | |
| | | | | 1 | assed Seismi | - | - | 1 | | 1 | | |
| Building Code | _ | est Criteria | S _{DS} | z/h | Ip | | A _{FLX-H} | | | A _{FLX-V} | A _{RIG-V} | |
| CBC 2010 | | CC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3 | 3.65 | 2.74 | ł | 2.44 | 1.83 | |
| Test Mounting | ; De | etails: | | | | | Y | | | | | |



The unit was anchored to the table using four VMC MS-1C-150 spring isolators which were welded to the table surface.

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| | | DEngine | ers, Inc. | | Uni | it Und | er 1 | | דע # (יייי) | | | |
|-------------------------------------|-----|--------------|-----------------|--|------------------------------------|--------------------|------------------|-----------|----------------|--------------------|--|--|
| 1965A 33rd S | | | | Unit Under Test (UUT) Summary Sheet | | | | | | | | |
| Boulder, CO 8 | | L | | | | Summ | nary | / Sh | eet | | | |
| (303)443-758 | 0 | | | | | | A | NCO P | roject Nu | mber: 3298.05 | | |
| Manufacture | r: | | | | n (Schofield, V | VI, USA) | | | | | | |
| Model Line: | | Mixed Flow | | entilat | ion Fans | | | | | | | |
| Model Numb | er: | QEID-54-75 | | | | | | | | | | |
| Product Construction Summary: | | | | | line fan base r el housing, Arr | | | MSH-1 | LE-1700 s | eismic spring | | |
| Options/ | | Quick Oper | ning Acces | s Doc | or, Sure-Aire, I | nlet & Outl | et Flan | ige, Inle | et & Outl | et Guards, | | |
| Subcompone | nt | Copper Luk | eLines, N | lotor: | Marathon Ele | ctric, 100H | p, 460 | V. Dire | ct Drive. | | | |
| Summary: | | | | | | | | | | | | |
| | | | | | UUT Propertie | | | | | | | |
| Weight (lb) | Dir | mensions (ir | - | | | | Lowest Natura | | | 1 | | |
| | | pth | Width | | Height | Front-B | ack | Side-Side | | Vertical | | |
| 4350 | 86 | .5 | 82 | | 80 | 3.7 | | 6.1 | | 10.5 | | |
| | | | - | 1 | assed Seismic | - | 1 | | | | | |
| Building Code | | est Criteria | S _{DS} | z/h | I _P | A _{FLX-H} | A _{RIG} | | | A _{RIG-V} | | |
| CBC 2010 Test Mountin | | CC-ES AC-156 | 2.28 | 1.0 | 1.5 | 3.65 | 2.74 | 1 | 2.44 | 1.83 | | |
| 100 | | | | | | | | | | | | |

The unit was anchored using four VMC MSH-1E-1700 seismic spring isolators. The fan was bolted to the isolators using 5/8"-11 bolts into a tapped transfer block (since the fan had a single bolt hole, but the isolators had a 4 bolt pattern) and the isolators were welded to steel plates on the table surface.

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