RevB
As-BuiltFinal
SO#100213

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AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

SUBMITTAL DRAWINGS

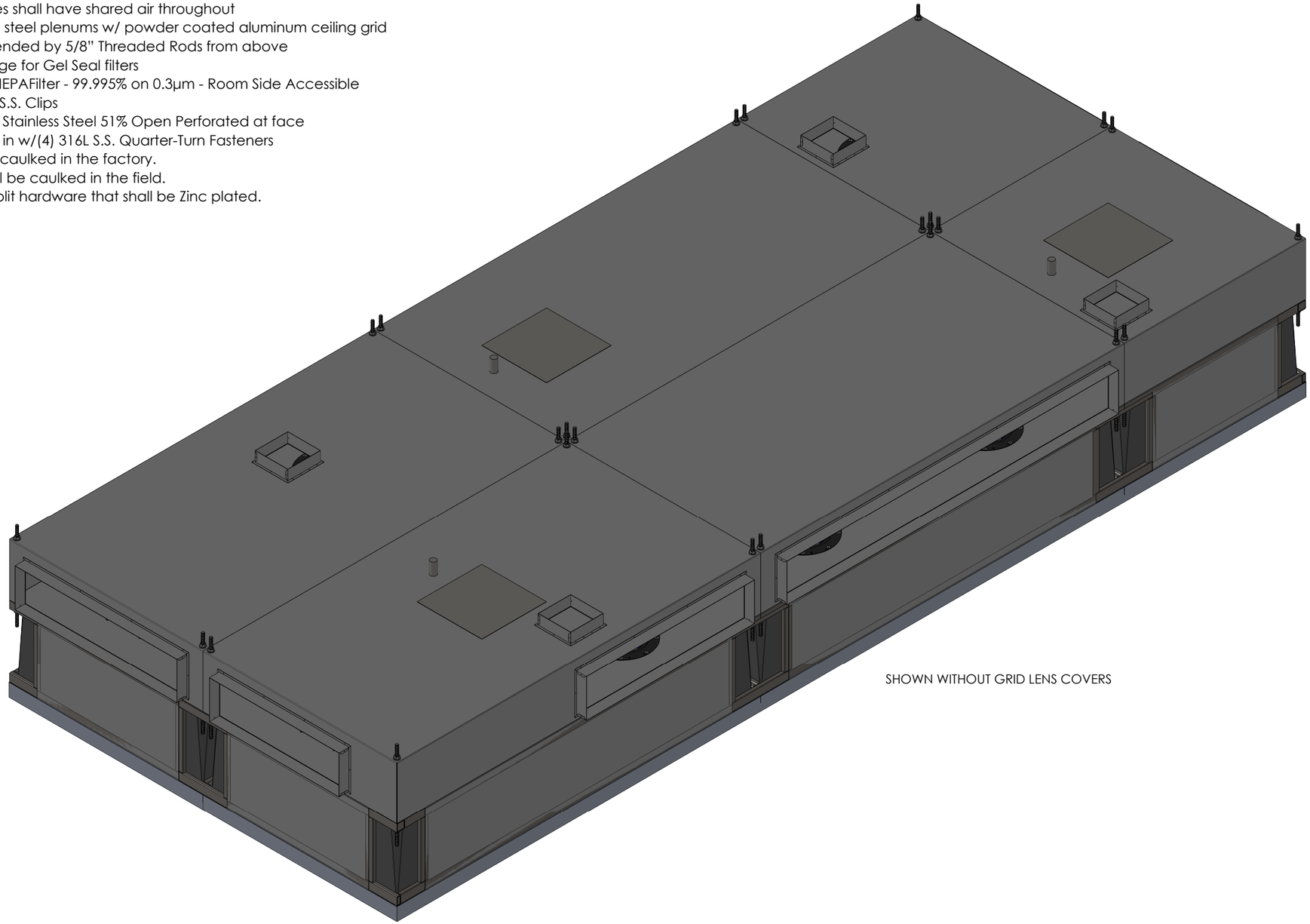
AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

FPP

FAN POWERED PLENUM
W/LED LIGHTING

Unit Construction:

- 34" High Fan Powered Plenum (13" R/A Plenum & 21" S/A Plenum)
- All plenum-to-plenum modules shall have shared air throughout
- FFP's shall be powder coated steel plenums w/ powder coated aluminum ceiling grid
- All FPP Modules shall be suspended by 5/8" Threaded Rods from above
- Ceiling grid will have knife edge for Gel Seal filters
- Filters shall be Camfil: 2" H14 HEPAFilter - 99.995% on 0.3µm - Room Side Accessible
- Filters are secured w/(4) 316L S.S. Clips
- Diffusions Screens will be 316L Stainless Steel 51% Open Perforated at face
- Diffusion Screens are secured in w/(4) 316L S.S. Quarter-Turn Fasteners
- All Plenum and Grids shall be caulked in the factory.
- All Plenum and Grid splits shall be caulked in the field.
- AJC shall supply all Module Split hardware that shall be Zinc plated.



SHOWN WITHOUT GRID LENS COVERS

REV	REVISION DESCRIPTION	DESIGNER	DATE

AJ MFG.
8701 ELMWOOD AVE #400 KANSAS CITY, MO 63132
PH: 816.231.5522 FAX: 816.231.8437
TOLL FREE: 800.247.5746
WWW.AJMFG.COM

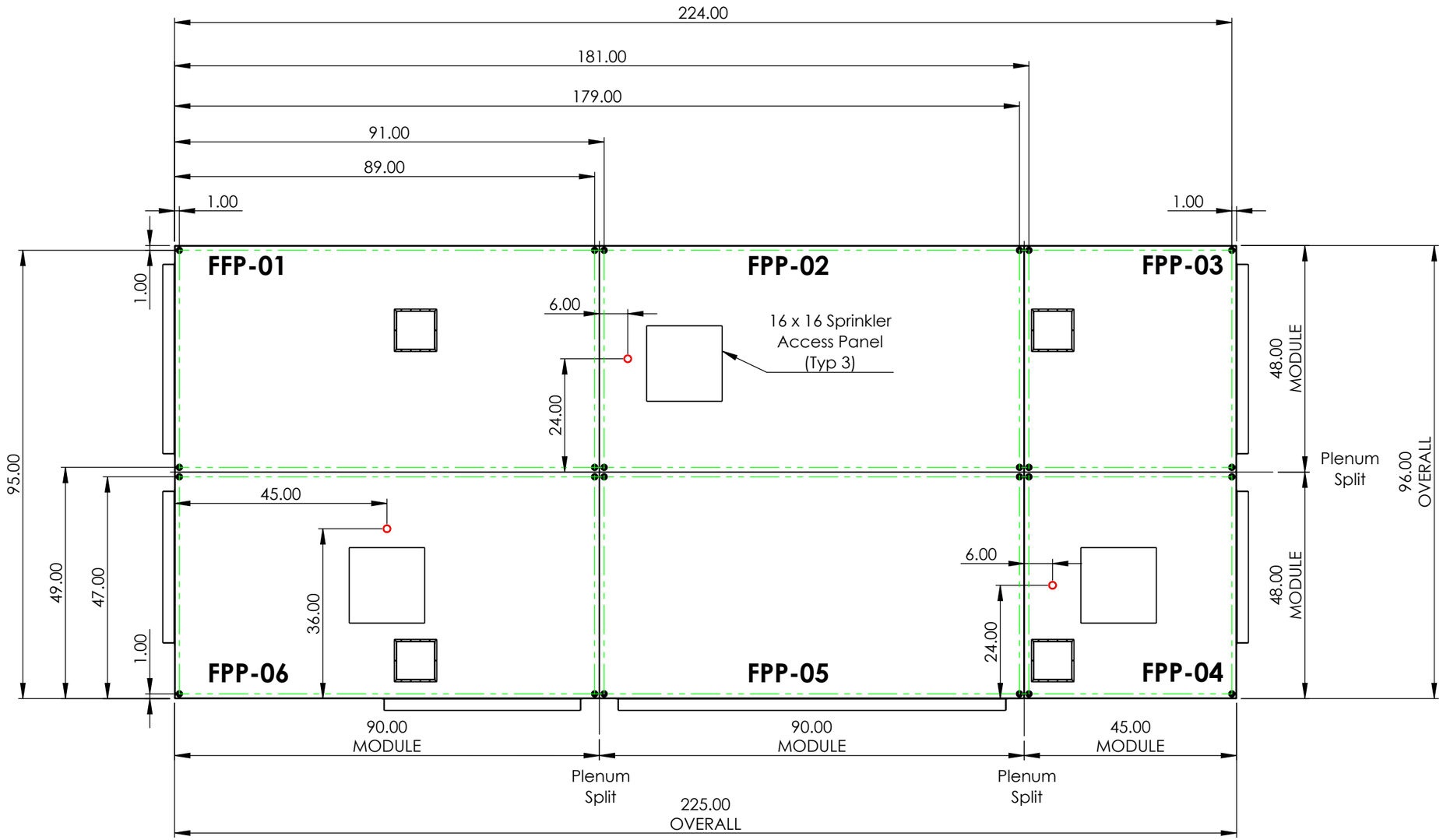
DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **FAN POWERED PLENUM**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:50**	SHEET NO **1/9**

FPP

FAN POWERED PLENUM
W/LED LIGHTING

CONCEALED SPRINKLER =
SUSPENSION CENTERS =

MODULE WEIGHTS	
MODULE TAG	**WEIGHT (lbs)**
FPP-1	808
FPP-2	808
FPP-3	434
FPP-4	434
FPP-5	808
FPP-6	808



PLAN VIEW

REV	REVISION DESCRIPTION	DESIGNER	DATE

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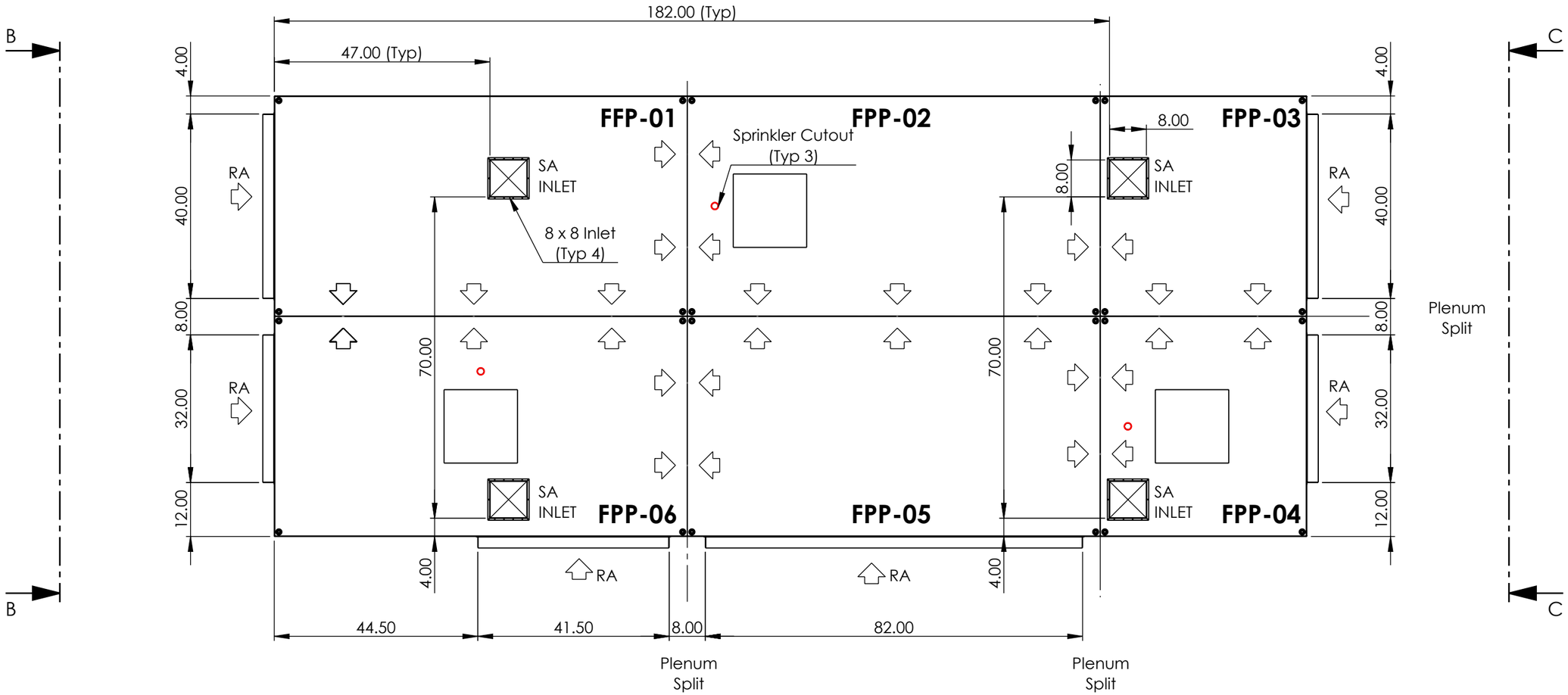
DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **SUSPENSION & SPRINKLER POC**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **2/9**

FPP

FAN POWERED PLENUM
W/LED LIGHTING

SHARED AIR =



PLAN VIEW

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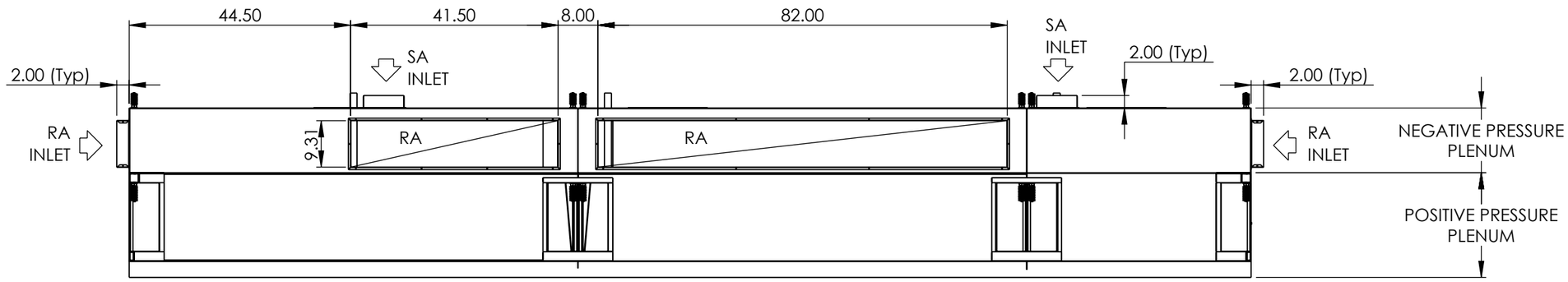
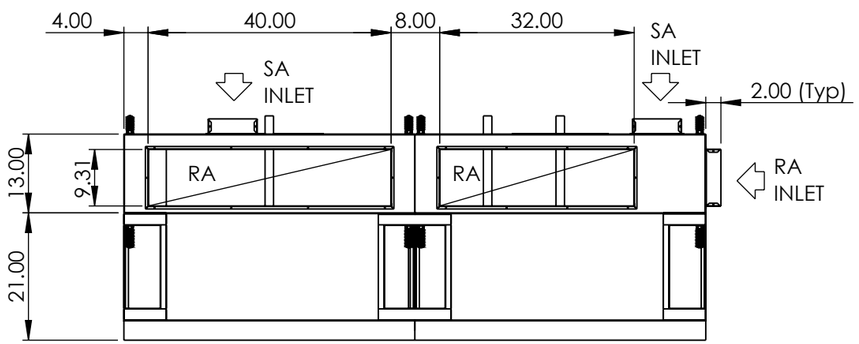
DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **PLENUM LAYOUT & INLETS**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **3/9**

FPP

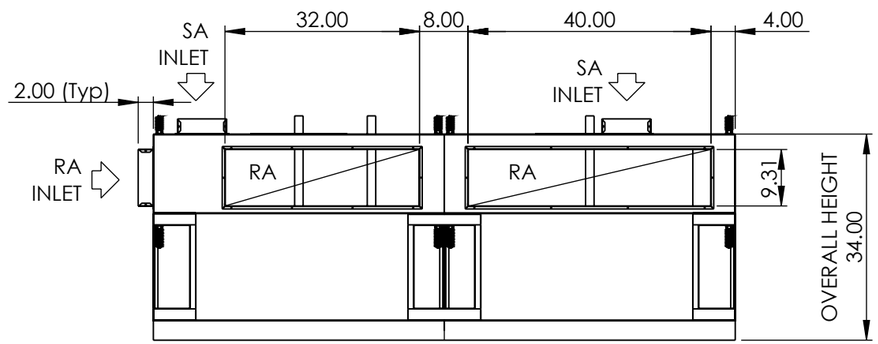
FAN POWERED PLENUM
W/LED LIGHTING



SIDE VIEW A



END VIEW B



END VIEW C

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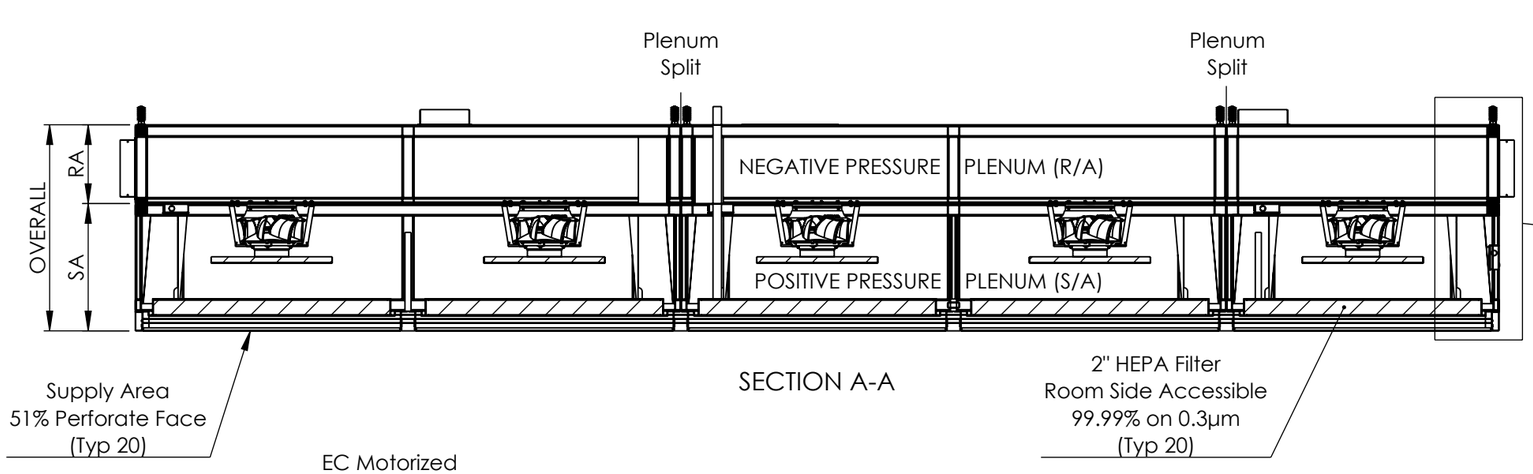
DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **ELEVATION VIEWS**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **4/9**

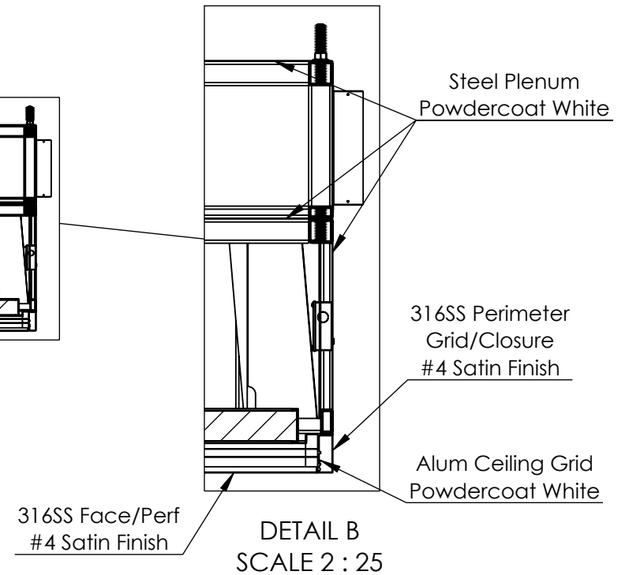
FPP

FAN POWERED PLENUM
W/LED LIGHTING

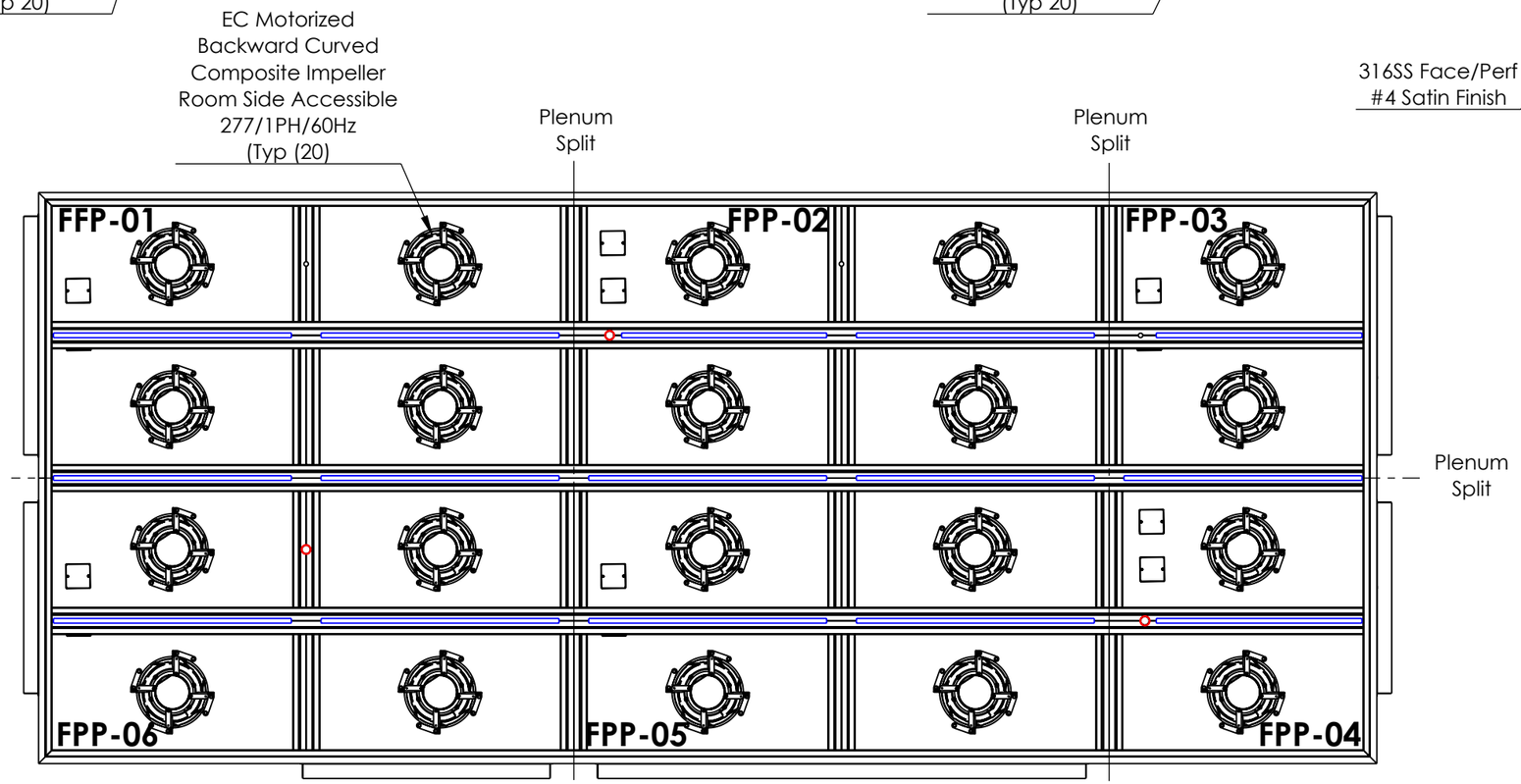
LED LIGHTING =



SECTION A-A



DETAIL B
SCALE 2 : 25



PLAN VIEW

						DATE
						DESIGNER
						REVISION DESCRIPTION
						REV

AJMFG.
8701 ELMWOOD AVE #400 KANSAS CITY, MO 63132
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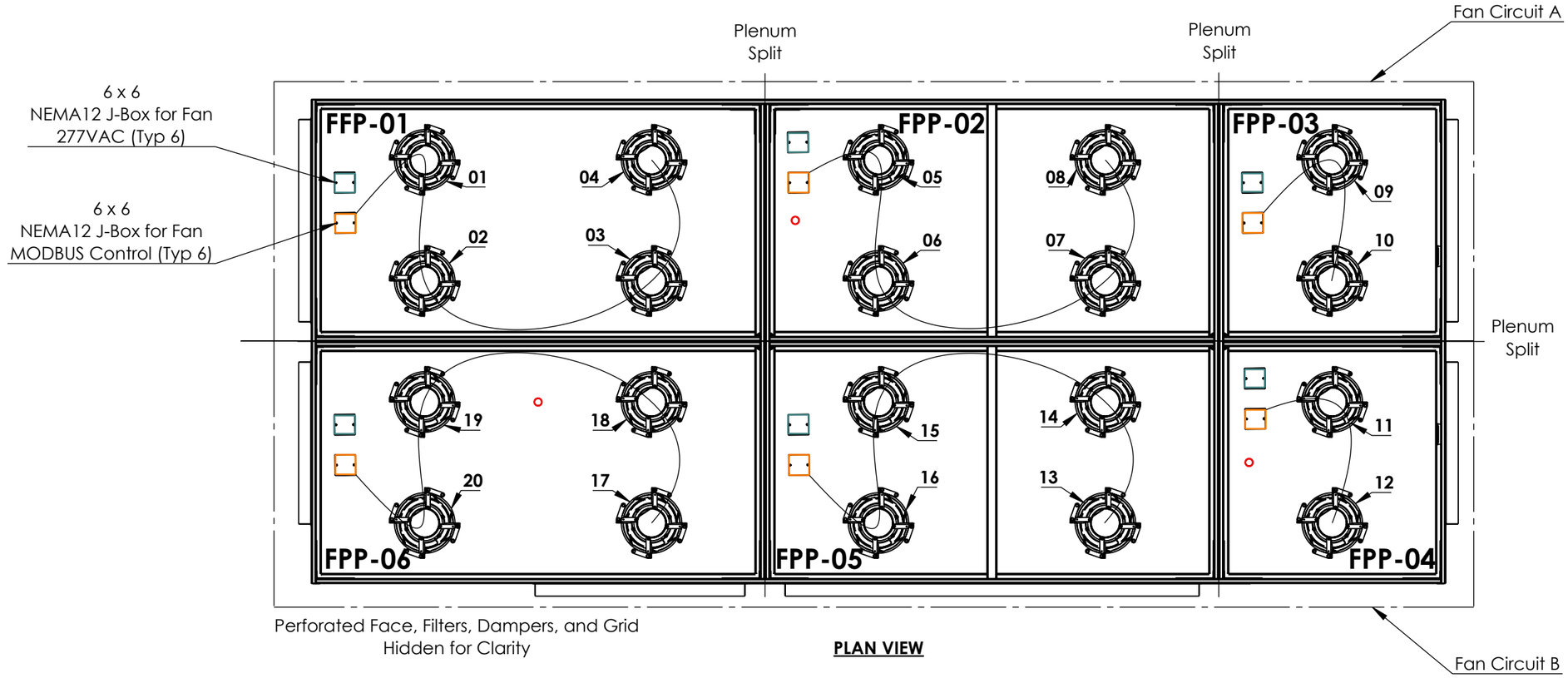
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **PLENUM SYSTEM**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **5/9**

FPP

FAN POWERED PLENUM
W/LED LIGHTING



PLAN VIEW

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DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **FAN LAYOUT**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **6/9**

FPP

FAN POWERED PLENUM
W/LED LIGHTING

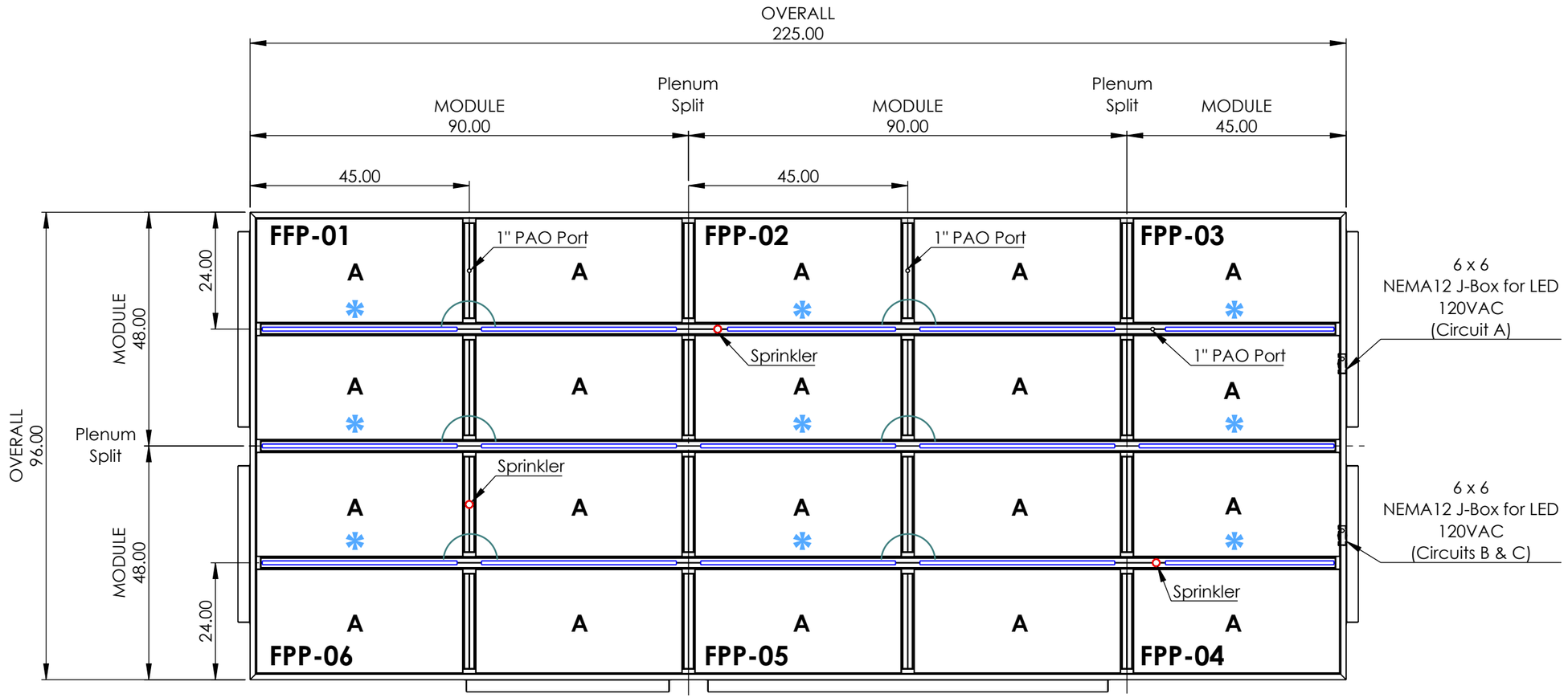
DRIVER LOCATION = ✻

CIRCUIT FOR LIGHTS				
CIRCUIT	**LED COLOR**	**# OF DRIVERS**	**INPUT AMPS @ 120V**	**OUTPUT WATTS**
A	White - 4000K	3	3.15	300
B	White - 4000K	3	3.15	300
C	White - 4000K	3	3.15	300

INPUT Current for 100W Driver - VLM100 Series
(Per Driver - 1.05A @ 120V)

CIRCUIT FOR FANS			
CIRCUIT	**FLA/FAN**	**MCA**	**MOCP**
A	1.10A	11.3	15
B	1.10A	11.3	15

TAG	FILTER SIZE	QUANTITY
A	41.125 x 22.375	20
TOTAL NUMBER OF FILTERS		**20**



PLAN VIEW

DATE	DESIGNER	REVISION DESCRIPTION	REV

AJ MFG.
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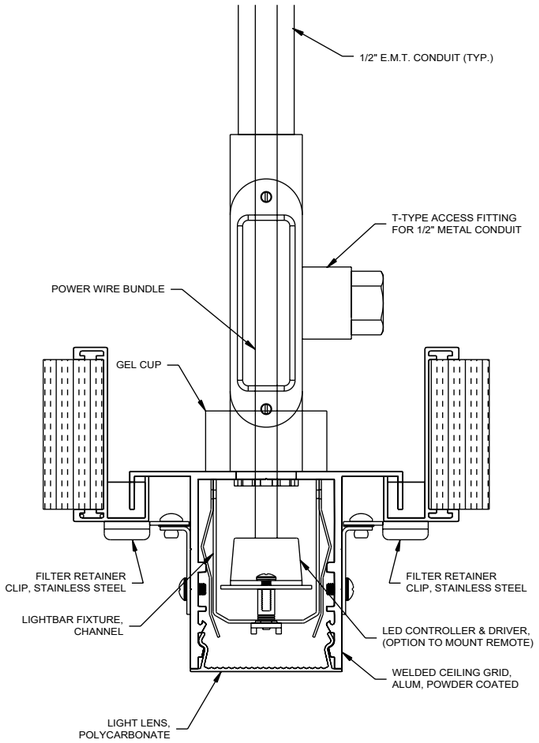
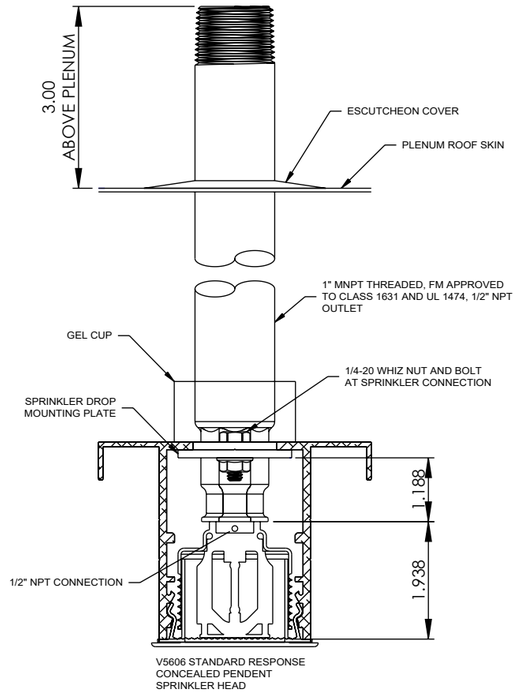
DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **CEILING LAYOUT**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **7/9**

FPP

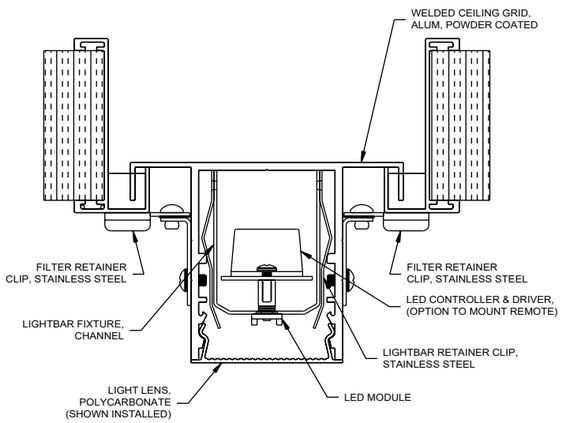
FAN POWERED PLENUM W/LED LIGHTING



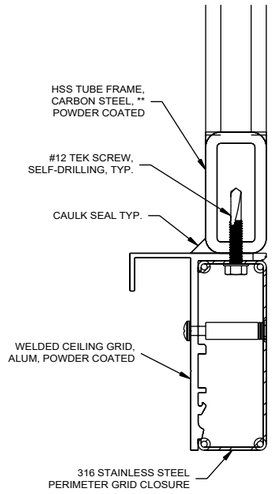
ELECTRICAL PENETRATION



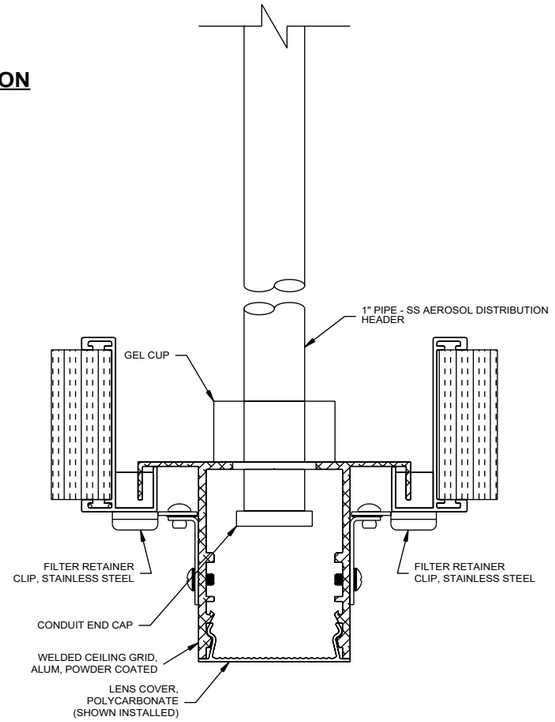
SPRINKLER PENETRATION



LED DETAIL



PERIMETER DETAIL



AEROSOL PORT PENETRATION

REV	REVISION DESCRIPTION	DESIGNER	DATE

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WWW.AJMFG.COM

DESIGNED BY **AGL**	DATE **12/12/24**
SALESPERSON **RH**	REVISION **B**
TAG	QUANTITY **1**
MATERIAL TYPE **See Notes**	FINISH **See Notes**
ORDER DIMENSION **225 X 96**	
TITLE **CONSTRUCTION DETAILS**	
JOB NAME **B28 Sustainability**	
DRAWING NO **111324-181**	
QUOTE NO	
SALES ORDER NO **100213**	
SHEET SCALE **1:25**	SHEET NO **8/9**

FPP

FAN POWERED PLENUM
W/LED LIGHTING

SHIP LIST

- MODULE FPP-01 90.00" X 48.00"
- MODULE FPP-02 90.00" X 48.00"
- MODULE FPP-03 45.00" X 48.00"
- MODULE FPP-04 45.00" X 48.00"
- MODULE FPP-05 90.00" X 48.00"
- MODULE FPP-06 90.00" X 48.00"

- QTY 20 LABELED FACES
- QTY 1 LIGHT BAR 2
- QTY 1 LIGHT BAR 4
- QTY 1 LIGHT BAR 5

- VAR LENS LENGTHS

- HARDWARE PACK
  - QTY 50 H1A45 1/2"-13 X 5.0" BOLT
  - QTY 50 H1A60 1/2"-13 X 3.0" BOLT
  - QTY 95 H1B29 1/2"-13 NUT
  - QTY 180 H1V26 1/2" WASHER

- CAULKING
  - QTY 12 - WHITE
  - QTY 3 - SILVER

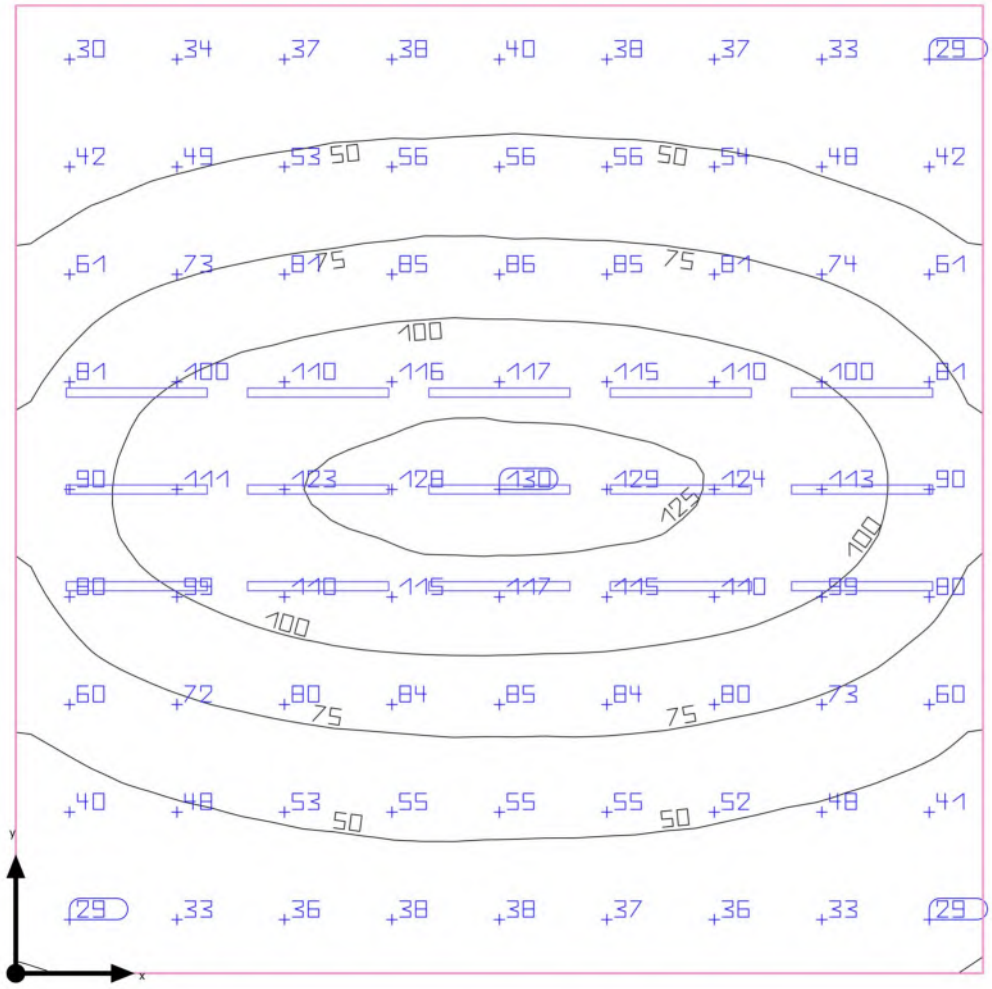
REV	REVISION DESCRIPTION	DESIGNER	DATE

AJ MFG.
8701 ELMWOOD AVE #400 KANSAS CITY, MO 63132
PH: 816.231.5522 FAX: 816.231.8437
TOLL FREE: 800.247.5746
WWW.AJMFG.COM

DESIGNED BY: AGL	DATE: 12/12/24
SALESPERSON: RH	REVISION: B
TAG:	QUANTITY: 1
MATERIAL TYPE: See Notes	FINISH: See Notes
ORDER DIMENSION: 225 X 96	
TITLE: SHIP LIST	
JOB NAME: B28 Sustainability	
DRAWING NO: 111324-181	
QUOTE NO:	
SALES ORDER NO: 100213	
SHEET SCALE: 1:25	SHEET NO: 9/9

Building 1 · Storey 1 · Room 1 (Light scene 4 (Room 1))

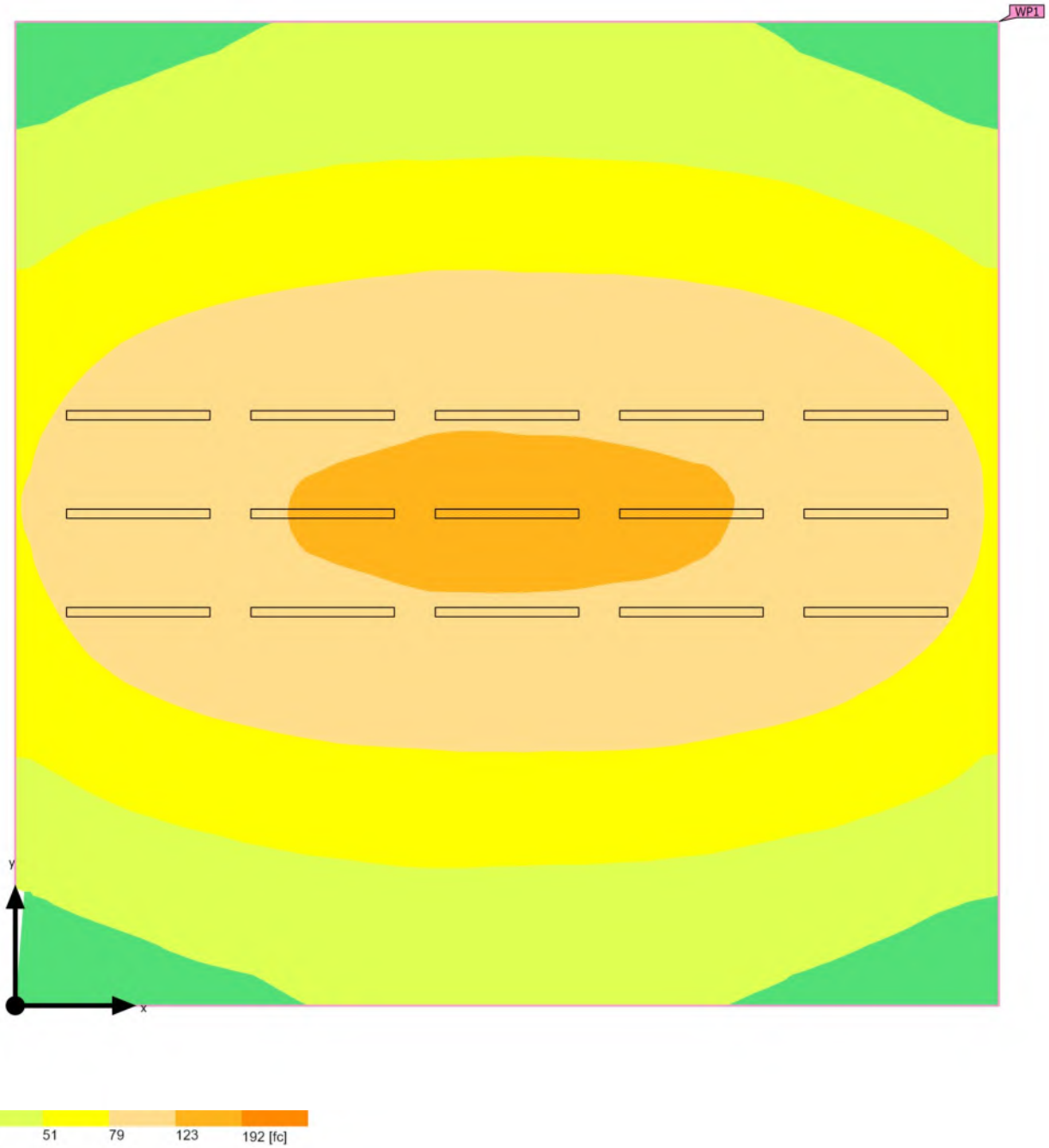
Summary



Ground area	400.01 sq ft	Clearance height	10.000 ft
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 44.2 %	Mounting height	10.000 ft
		Height Working plane	3.000 ft
Maintenance factor	0.80 (fixed)	Wall zone Working plane	0.000 ft

Building 1 · Storey 1 · Room 1 (Light scene 4 (Room 1))

Calculation objects



Building 1 · Storey 1 · Room 1 (Light scene 4 (Room 1))

Calculation objects

Working planes

Properties	$\bar{E}$ (Target)	E_{min}	E_{max}	U_o (g_1) (Target)	g_2	Index
Working plane (Room 1) Perpendicular illuminance (adaptive) Height: 3.000 ft, Wall zone: 0.000 ft	71.3 fc (≥ 92.9 fc) ✗	24.7 fc	130 fc	0.35 (≥ 0.60) ✗	0.19	WP1

Utilisation profile: Health care premises - Operating areas (5.46.2 Operating theatres)

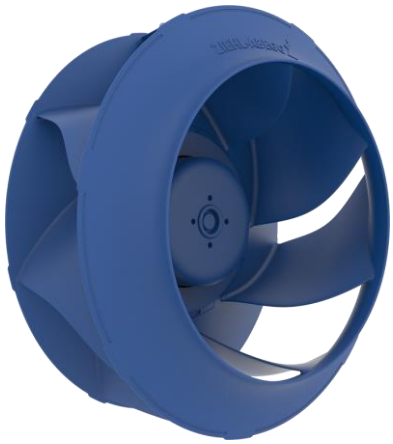
PERFORMANCE DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

EN

Movement by Perfection

The Royal League in ventilation, control and drive technology



Product documentation

Type
RH28V-6IK.BA.VR

Article number
192559

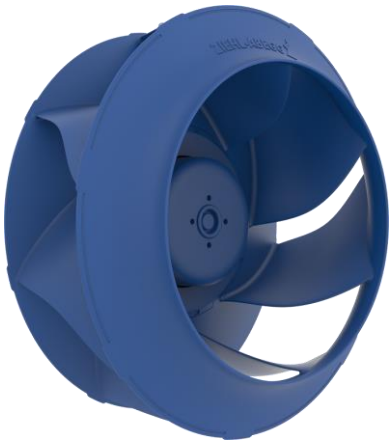
ZIEHL-ABEGG

Product documentation

ZIEHL-ABEGG Subsidiary
USA ZIEHL-ABEGG Inc.
719 N. Regional Road
GREENSBORO, NC 27419
USA
Phone +1 336 8349339
Fax +1 336 8349340
www.ziehl-abegg.us
info@ziehl-abegg.us

Type
RH28V-6IK.BA.VR

Article number
192559



2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

Table of Contents

2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

1. Product Specification - Technical Data

Article number	192559
Type	RH28V-6IK.BA.VR
Rated values	1~200-277V 50/60Hz P(ed) 290W 1.50-1.10A 2040min^{-1} 60°C
Electrical connection	Integrated controller
ErP Data	Measurement category ErP: A Air flow q(v) on Eta opt: 1553 m3/h Pressure increase p(fs) on Eta opt: 313 Pa Input power P(ed) on Eta opt: 253 W Efficiency H(statA): 61.8 % Efficiency grade: N(actual) = 66.6 / N(target) = 50* *ErP 2015
Heat Class	Thermal class 155
Control	ECblue basic (inclusive MODBUS)
Power Factor Controller	1~PFC
Painting Stator	Stator unpainted
Coating Rotor	Rotor 2 coatpaint resistance class 3 (L-TI-0596)
Colour Sheet Rotor	RAL 5002 (ultramarine blue)
Material Impeller	Impeller made of High Performance Composite Material
Painting Impeller	unpainted
Colour Impeller	like RAL 5002 (ultramarine blue)
Connection Diagram	1360-384
Installation Position	Fitting position H/Vu/Vo
Fitting Position Mot	Mounting position H/Vu/Vo
Motor Protection	integrated active temperature management
Type Of Protection	IP54
Impregnation	Moisture and hot climate protection
Bearing Quality	ball bearing with long-time lubrication
Labelling Ul/Csa	E347018 ZC-155, MK090-0109
Painting Motor	Stator/rotor separately
Colour Motor	Stator/rotor separately
None	
Disclaimer Ct20/Doe	Selected product is not governed by U.S. DOE and CT20 industrial fan and blower regulations.

2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

2. Duty Point Data

RH28V-6IK.BA.VR (192559)

Design | Fan Size | Motor Brand		RH | 280 | ECblue
SFP CLass | SFP Value (PSFP)	- | wspm3	2 | 642,0
FEI		2,16
Reference FEP | Actual FEP	kW	0,36 | 0,0
Airflow (qV) | Airflow Mains	cfm	675,0 | 838,45
Pressure, stat. (psF) | Static Pressure Mains	InWG	1,25 | 1,93
Dynamic Pressure	InWG	0,04
Total Pressure (pF)	InWG	1,29
Air Velocity	fps	14,4
Density	lbpft3	measured_density
Temperature	celsius	20
RPM (n) | RPM Percentage | max. (nmax)	1/min	1977,39 @ 96,93% | 2040
Absorbed Power (Psys)	kW	0,2
System Efficiency, stat. (ηsF,sys) | tot. ($\eta_{F,sys}$)	%	48,44 | 50,03
Eta ERP | ERP Year		66,6 | 2015
Frequency	Hz	60
Voltage	V	230
Current	A	0,92
Suction Acoustics (Lw(A),5) | ($Lw_{,5}$)	dba	66 | 77
Pressure Acoustics (Lw(A),6) | ($Lw_{,6}$)	dba	73 | 78
Enclosure / Impeller		
Dimensions (Width x Height x Depth)	in	11 x 11 x 8
Installation (Width x Height x Depth)	mm	x x
Mass	kg	4,5
Kfactor | Kfactor Grille		|
Nozzle Pressure (psF Düse)	Pa	0,0
Guard Grille	no	

Selected product is not governed by U.S. DOE and CT20 industrial fan and blower regulations.

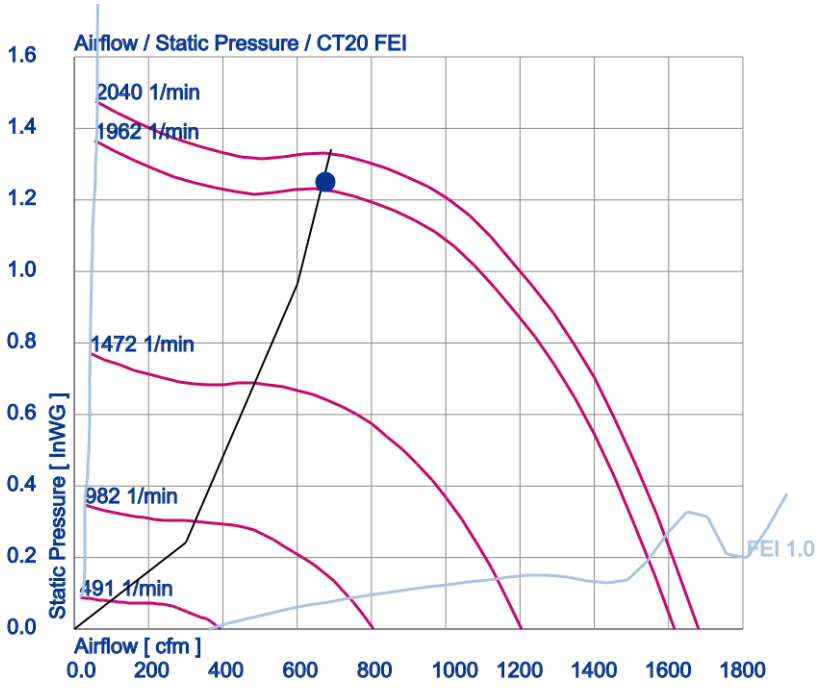
Full Octave band

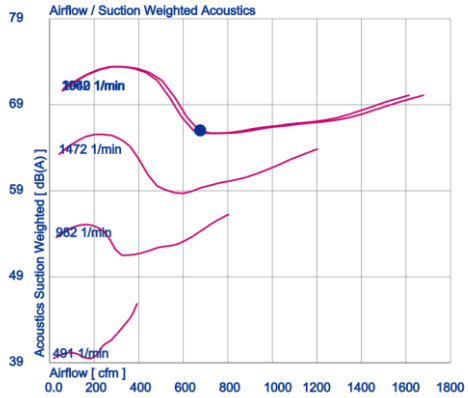
f [Hz]	sum	63	125	250	500	1000	2000	4000	8000	f [Hz]	sum	63	125	250	500	1000	2000	4000	8000
$L_{w,5}$	77	75	69	65	62	60	59	54	48	$L_{w,6}$	78	74	71	70	66	66	68	62	55
$L_{w(A),5}$	66	49	54	56	59	60	60	56	47	$L_{w(A),6}$	73	47	57	61	63	66	69	63	54

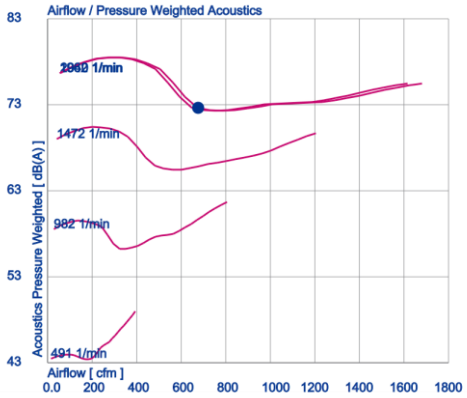
2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

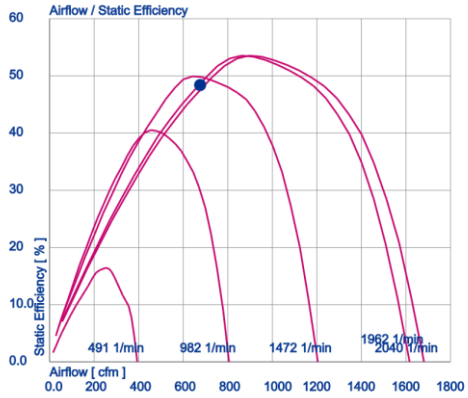
Article number
192559

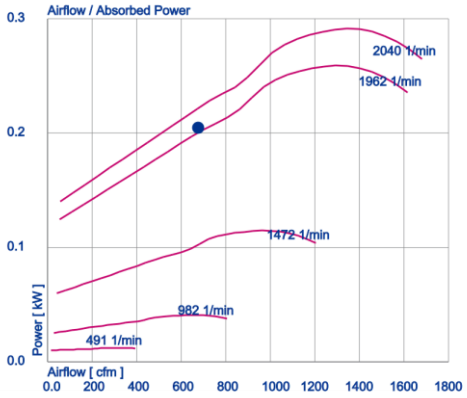
3. Characteristic Curve





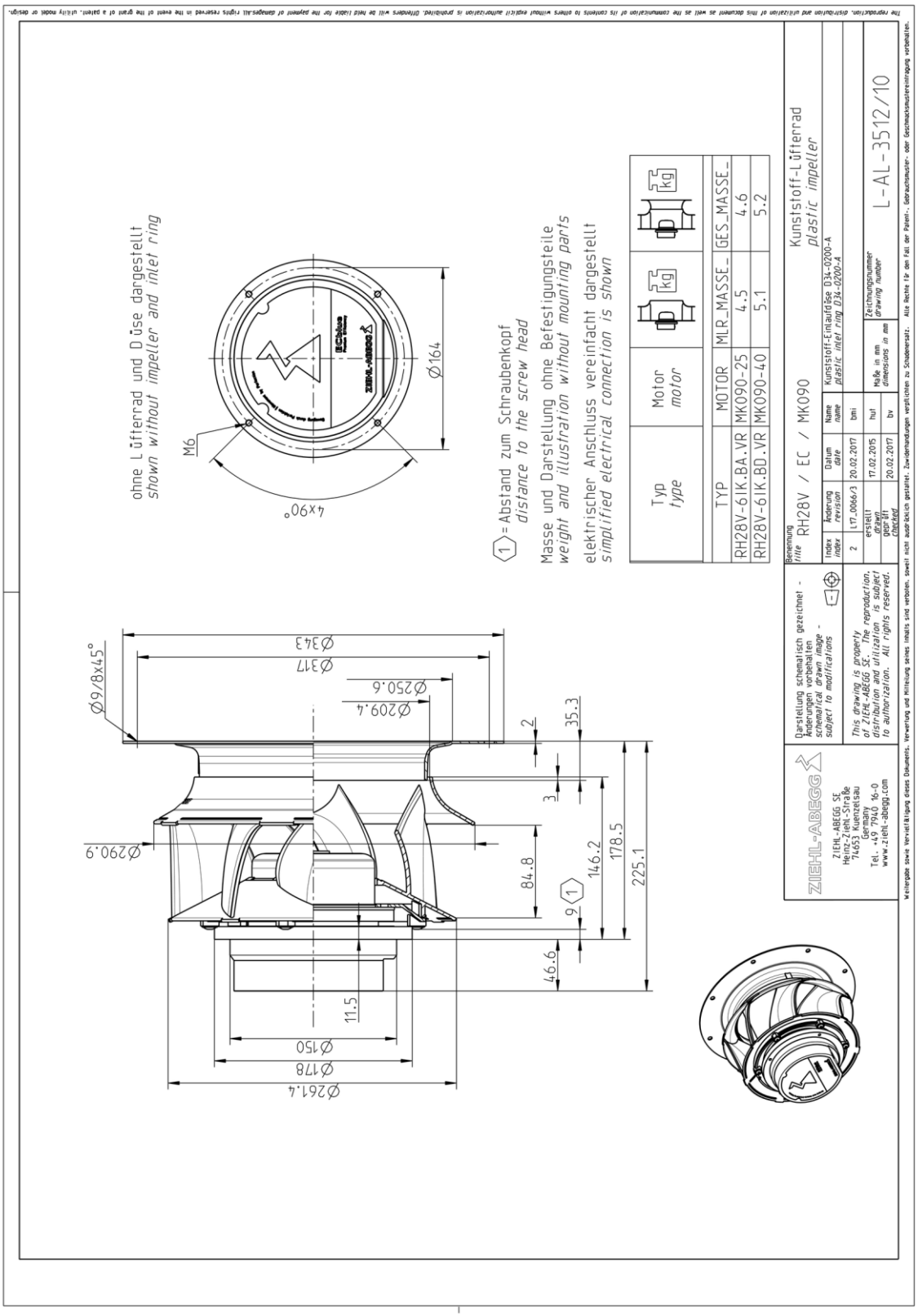






2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

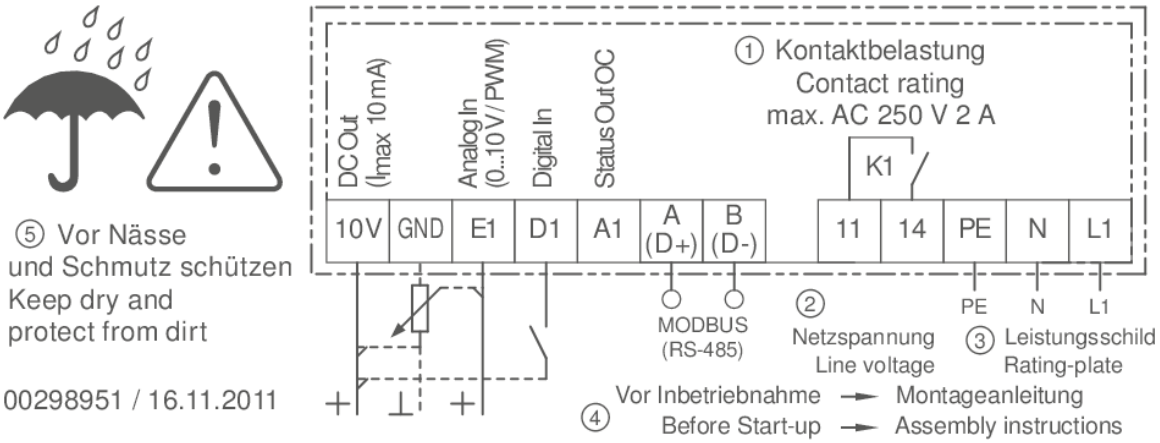
4. Drawing



Dimensions in mm

The illustrations shown make no claim to completeness and are for orientation purposes only.

5. Connection Diagram



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6. Deviation List

No customer specification was available. Please note that ZIEHL-ABEGG does not confirm technical requirements beyond this specification if they are not listed in a list of deviations.ZIEHL-ABEGG can therefore neither guarantee nor prove the suitability of this product for this specific application or the customer's intended use. The customer is responsible for testing and approving the product for its intended use.

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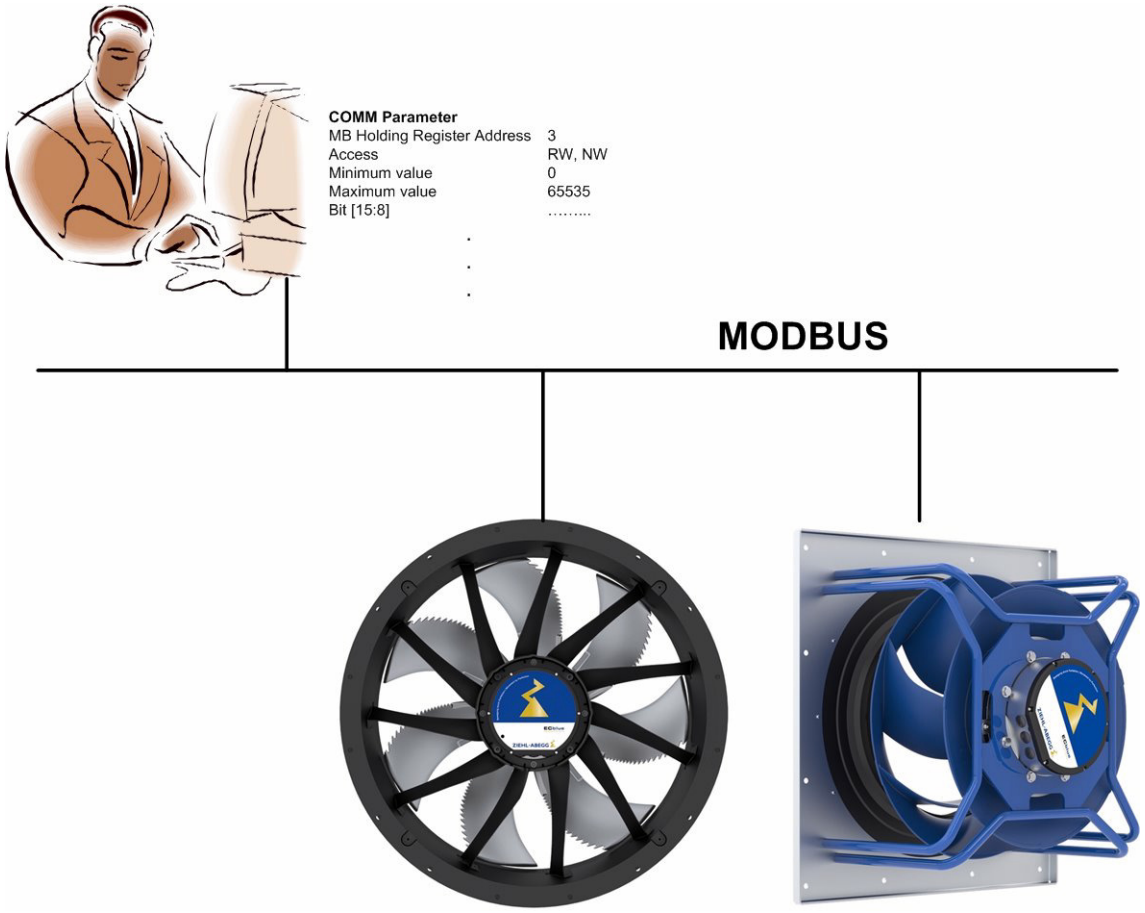
ZIEHL-ABEGG EVENTS

2024_12_04_14_07_13_599216_7bbe10812924d04e6c61d2701e8e722d3b069e758472eceacadff31b3781b905

Description MODBUS Communication

ECblue BASIC-MODBUS



Preliminary edition!

Software version: ECblue Firmware from 1.00

Content

1 General notes

1.1 Target group

This specification addresses users with excellent knowledge of serial bus systems and in particular of the MODBUS RTU protocol.
The MODBUS RTU protocol specification is not part of this document.

1.2 Exclusion of liability

Concurrence between the contents of these document and the described software has been examined. It is still possible that non-compliances exist. No guarantee is assumed for complete conformity.- To allow for future developments given are subject to alteration.We do not accept any liability for possible errors or omissions in the information contained in data, illustrations or drawings provided. ZIEHL-ABEGG SE is not liable for damage due to misuse, incorrect or improper use.

1.3 Copyright

2 Safety instructions

Attention!
Remarks concerning safety, installation and connection must be followed (see Assembly instructions or Operating Instructions).

3 MODBUS Register Description

3.1 Explanations

- The device can be controlled and parameterised by the MODBUS-RTU protocol. The MODBUS-RTU protocol implementation of the device complies with the standards as described in the MODBUS Application Protocol Specification 1.1b3. Not all the function codes contained therein are implemented in the device. The device basically supports all functions which are available for Holding, Input and Coil registers.
- In order to be able to write a register, the respectively necessary PIN protection level (write protection) must be taken for ECblue fans and devices with communication modul AM-MODBUS (Icontrol Basic, Fcontrol Basic, ..) into account (see according Operating Instructions).
- All registers marked with "NV" have limited write cycles (10.000). Registers of this type must only be used for configuration purpose.
- The device supports all standard MODBUS functions for register write and read (Read Register, Write Single Register, Write multiple Register, see chapter Data model and access options).
- The default COMM parameters are 19200, 8, E, 1 Address 247 (if not otherwise specified).
- Changes to the COM parameters only become effective after a device reset or input of a certain PIN (see corresponding Operating instructions).
- If the auto addressing feature is supported multiple devices in a network can be addressed automaticaly. For this purpose a suitable PC software (ZAset) is required.
- Communication via MODBUS TCP/IP possible by separate gateway (e.g. Part.-No. 380091). The register description is also valid for MODBUS TCP/IP.
- Negative values are displayed in two's complement.

Kind of register

Abbreviation	Possible access
R	**Register readable**
RW	**Register readeable and writeable**
NV	**Register permanent stored (non-volotile)**

Abbreviations for registers/coils/discrete inputs

h18	Example for access to holding register 19 with address 18
i12	Example for access to input register 13 with address 12
c0	Example for access to coil register 1 with address 0
d5	Example for access to discrete input 6 with address 5

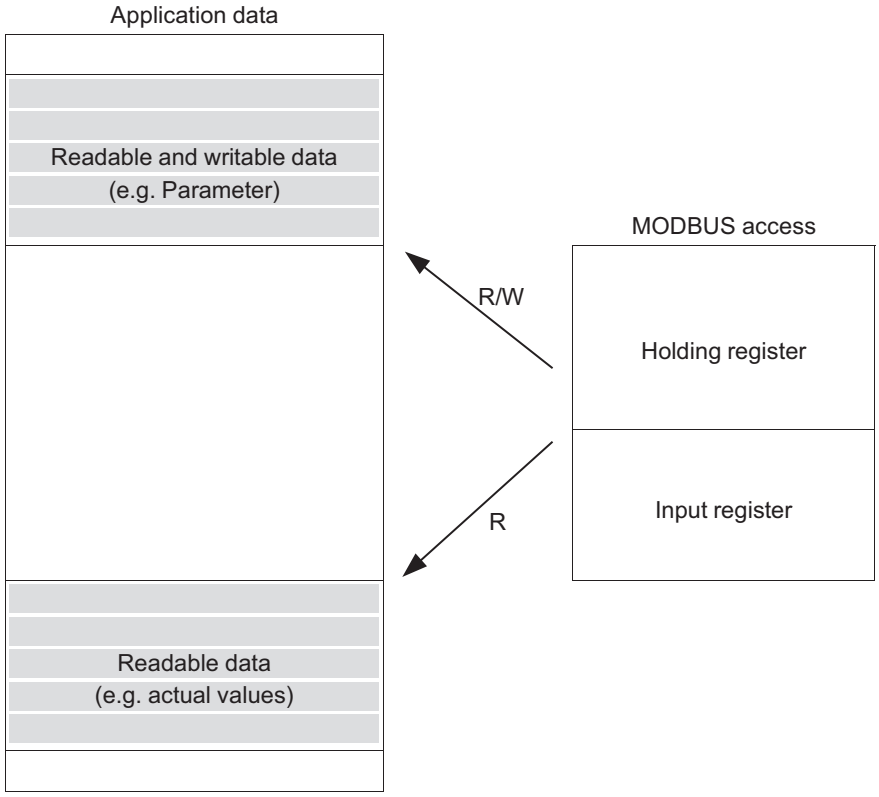
Necessary PIN protection level for acces to register for ECblue or devices with AM-MODBUS (Icontrol Basic, Fcontrol Basic, ..)

[0]	Not protected, in each PIN protection level recordably
[1]	Starting from adjustet PIN protection level [1] or higher recordably. For adjusted PIN protection level [0] PIN: 1234 necessary.
[2]	Starting from adjustet PIN protection level [2] or higher recordably. For adjusted PIN protection level [0] and [1] PIN: 0010 necessary.
[3]	Only with administrator password recordably.

3.2 Data model and access options

The MODBUS access to the application data is gained with the following MODBUS functions for registers:

- Read Input register (function code 4)
- Read Holding register (function code 3)
- Write Single register (function code 6)
- Write Multiple registers (function code 16)
- Read Coil register (function code 1)
- Write Single Coil Register (function code 5)
- Write MultipleCoil registers (function code 15)



The application data are arranged completely in the Holding Register and the Input Register section respectively beginning at MODBUS register address **0**.
An exception message is output on exceeding the register range.
It is urgently recommended to observe the further informations and examples in the corresponding Operating Instructions.

3.3 Control

3.3.1 MB Holding Register 1, Address: h0 = PIN input

MB Holding Register1, Address: h0	**PIN input**
Code input to execute special functions e.g. default setting	
Access / necessary PIN protection level	RW / [0]
minimal value	0
maximum value	65535
Default	0
Bit [15:0]	Decimal value 0 - 65535

PIN Code	**Function**
3698	Communications parameters take-over
2143	Reset motor controller (approx. 3.2 sec delay)
1234	Release of the PIN protection level [1], at programmed PIN protection level [0] (☞ MB Holding Register 17 address h16: bit [9:8])
0010	Release of the PIN protection level [2], at programmed PIN protection level [0] and [1] (☞ MB Holding Register 17 address h16: bit [9:8])
7401	Reset current maximum value memory
7500 - 7509	Selection events memory 0 up to 9 (content of events memory place is copied in query i30, i31 register). 7500 is the most current fault
9095	Restore to factory setting = delivery status
xxxx	Administrator password (factory configuration)
xxxx	Delete error memory
xxxx	COM Watchdog Reset
xxxx ☞ Code on request from ZIEHL-ABEGG	

Information

- Without any further action a released PIN protection level is reset automatically to the programmed PIN protection leval after approximately 15 minutes!
- Reset to factory setting is possible only by parameter set download. Each fan has a set of parameters. This is loaded by the factory and can be loaded any time with Ziehl-ABEGG tools again.

3.3.2 MB Holding Register 2, Address: h1 = Control

MB Holding Register 2, Address: h1	Control
Digital control is used for digital control of the device. The register bits controls digital functions. The digital control has to be enabled for each bit ☞ control mode register h4.	
Access / necessary PIN protection level	RW / 0
minimal value	0
maximum value	65535
Default	0
Bit [15]	1: K1 Control system
Bit [14]	1: Min. Speed "OFF"
Bit [13:7]	no function, reads 0
Bit [6]	1: Fire alarm 2
Bit [5]	1: Fire alarm 1
Bit [4]	1: Reverse
Bit [3]	1: Limit (h18)
Bit [2]	1: Set Intern3 (h9) for control mode 0...4 (h4, Bit [3:0.])
Bit [1]	1: Set Intern2 (h6) for control mode 0...4 (h4, Bit [2:0.])
Bit [0]	1: Enable

3.3.3 MB Holding Register 3, Address: h2 = Speed control

MB Holding Register 3, Address: h2	Speed control
Used for speed control of the device. The interpretation of the value depends on control mode register (h4) Bit [3:0].	
Access / necessary PIN protection level	RW / 0
minimal value	0
maximum value	65535
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.4 Controller Setup

3.4.1 MB Holding Register 4, Address: h3 = COM Parameter

MB Holding Register 4, Address: h3	COM Parameter
Communication parameters for serial MODBUS communication. Settings made in this register will be made active after a device reset or by entering a PIN code, ☞ h0.	
Access / necessary PIN protection level	RW, NV / 1
minimal value	0
maximum value	65535
Bit [15:8]	Bus Address: 1 - 247, Default 247
Bit [7:4]	COM Baudrate: 19200Bd (default) 0 = 4800 1 = 9600 2 = 19200 3 = 38400 4 = 115200
Bit [3:0]	COM Mode: 8E1 (default) 0 = 8N1 1 = 8O1 2 = 8E1 3 = 8N2

Information
If communication is no longer possible due to incorrect setting of the communication parameters, see section "Emergency scenario (error handling)".

3.4.2 MB Holding Register 5, Address: h4 = Controlmode

MB Holding Register 5, Address: h4	Controlmode
Control mode defines how the device is controlled by the user.	
Access / necessary PIN protection level	RW, NV / 1
minimal value	0
maximum value	65535
Bit [14]	Buscon Firealarm 2[1] 0: h1 Bit 6 deactivated 1: h1 Bit 6 active
Bit [13]	Buscon Firealarm 1[1] 0: h1 Bit 5 deactivated 1: h1 Bit 5 active
Bit [12]	Buscon reverse (Rolling direct., Default = 0) 0: h1 Bit 4 deactivated 1: h1 Bit 4 active (OR'ed with digital input)
Bit [11]	Buscon Limit (speed limitation, Default = 0) 0: h1 Bit 3 deactivated 1: h1 Bit 3 active (OR'ed with digital input)
Bit [10]	Buscon Set intern 3 (Set Intern3, Default = 0) 0: h1 Bit 2 deactivated 1: h1Bit 2 active (OR'ed with digital input)
Bit [9]	Buscon Set intern 2 (Set Intern2, Default = 0) 0: h1 Bit 1 deactivated 1: h1 Bit 1 active (OR'ed with digital input)
Bit [8]	Buscon enable (Enable, Default = 0) 0: h1 Bit 0 deactivated 1: h1 Bit 0 active (OR'ed with digital input)

Bit [7:4]	Automatic reset after error 0: No automatic reset 1: Automatic reset after 1 minute 2: Automatic reset after 15 minutes 3: Automatic reset after 60 minutes
Bit [3:0]	Speed control mode (Default = 0) 0: Control by E1 (0 - 10 V / PWM) * 1: Speed control register h2 (absolute) 2: Speed control register h2 (fractional 0 - 32767 = 0 - 100 %) * 3: Speed control register h2 (fractional 0 - 100 = 0 - 100 %) * 4: Set Intern1 * 5: Set Intern2 6: Set Intern2 7: Control by E1 (quadratic characteristics) 8: Control by E1 (custom characteristics) 9: Control by E1 (air flow control) 10: Speed control register h2 (fractional; air flow control) 11: Speed control register h2 (quadratic characteristics) 12: Speed control register h2 (fractional; custom characteristics) 13: Control by E1 (0...24 mA) 14: Control by E1 (constant moment) 15: Speed control register h2 (fractional; constant moment) * with possibility for switch over to Set Intern 2,3

[1] **Attention!**

To achieve as long a life as possible, the devices have active temperature management. The modulation is reduced when internal temperature limits are exceeded.

In venting systems in which the fan must run at max. speed in the event of a fire, the temperature management / temperature monitoring can be switched off by a digital input. At the same time, the fan is operated independently of the speed setting for regular operation at maximum speed.

Attention! The device and its internal components are no longer protected against overtemperature when this function is activated (this affects the life ☞ installation instructions or operating instructions of the device).

The function is activated at the digital input with the contact open (at factory setting D1/E1 Inverting = OFF") so that the maximum speed of the fan is also possible with the line to the digital input interrupted in case of fire.

3.4.3 MB Holding Register 6, Address: h5 = Set Intern1: 1/min

MB Holding Register 6, Address: h5	**Set Intern1: 1/min ☞[2)]**
Set Intern1 for control mode Bit [3-0] = 4	
Access / necessary PIN protection level	RW, NV / 1
minimal value	h7
maximum value	h8
Default	1/3*h8
Bit [15:0]	Decimal value 0 - 65535

3.4.4 MB Holding Register 7, Address: h6 = Set Intern2: 1/min

MB Holding Register 7, Address: h6	**Set Intern2: 2/min ☞[2)]**
Set Intern2 for control mode Bit [3-0] = 5 In control mode Bit [3-0] = 0 up to 4 if digital control (h1) - Bit 1 = 1 or D1 = 1 if D1 function = 5 (h14)	
Access / necessary PIN protection level	RW, NV / 1
minimal value	h7
maximum value	h8
Default	2/3*h8
Bit [15:0]	Decimal value 0 - 65535

3.4.5 MB Holding Register 8, Address: h7 = Min. Speed: 1/min[3)]

MB Holding Register 8, Address: h7	**Min. Speed: 1/min ☞[2)]**
Minimal Speed	
Access / necessary PIN protection level	RW, NV / 1
minimal value	0
maximum value	h20
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.4.6 MB Holding Register 9, Address: h8 = Max. Speed: 1/min

MB Holding Register 9, Address: h8	**Max. Speed: 1/min ☞[2)]**
Maximal Speed	
Access / necessary PIN protection level	RW, NV / 1
minimal value	h7
maximum value	h20
Default	h20
Bit [15:0]	Decimal value 0 - 65535

3.4.7 MB Holding Register 10, Address: h9 = Set Intern3: 1/min

MB Holding Register 10, Address: h9	**Set Intern3: 3/min ☞[2)]**
Speed preset in control mode Bit [3-0] = 6 By control mode Bit [3-0] = 0 up to 4 if digital control (h1) - Bit2 = 1 or D1 = 1 if D1 function = 6 (h14)	
Access / necessary PIN protection level	RW, NV / 1
minimal value	h7
maximum value	h8
Default	3/3*h8
Bit [15:0]	Decimal value 0 - 65535

2)

n > “Max. Speed” (h8), is limited for operation to “Max. Speed”.

3)

If in Speed control mode “2” or “3” (☞ MB Holding Register 5, Address 4) the “Min. Speed” is set > 0, so the actual speed in the relationship is increased accordingly. I.e. this is then higher than the adjusted desired value of speed.

In Speed control mode “1” the adjusted speed (h2) maintains independently from the “Min. Speed”.

3.5 IO Setup

3.5.1 MB Holding Register 11, Address: h10 = Inverting

MB Holding Register 11, Address: h10	**Inverting**
Inverting E1, D1, K1	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Bit [15:3]	no function, reads 0
Bit [2]	1: K1 Inverting (NO = normally open contact), Default: 0
Bit [1]	1: D1 inverting Default: 0
Bit [0]	1: E1 inverting (10 V - 0 V) Default: 0

3.5.2 MB Holding Register 12, Address: h11 = E11 Min

MB Holding Register 12, Address: h11	**E1 Min: %**
Start value for the analog input E1. Example: 20 % means a useful range of 2 V - E1 Max. ≙ 0 - 100 % speed. (E1 Watchdog Mode ☞ MB Holding Register 18, Address: h17)	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	h12
Default	5 %
Bit [15:0]	Decimal value 0 - 65535

3.5.3 MB Holding Register 13, Address: h12 = E12 Max

MB Holding Register 13, Address: h12	**E1 Max: %**
End value for the analog input E1. Example: 80 % means a useful range of E1 Min. - 8 V ≙ 0 - 100 % speed.	
Access / necessary PIN protection level	RW, NV / 2
minimal value	h11
maximum value	100
Default	100
Bit [15:0]	Decimal value 0 - 65535

3.5.4 MB Holding Register 14, Address: h13 = E1 Function

MB Holding Register 14, Address: h13	**E1 Function (analog input)**
Function for E1 0: 0 - 10 V / PWM (Default) For settings higher "0" “E1” is working like “D1” as digital input. 1 = Enable, 3 = Limit, 5 = Set Intern2, 6 = Set Intern3, 13 = change direction of rotation, 15 = Firealarm 1, 19 = Firealarm 2	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	19
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.5.5 MB Holding Register 15, Address: h14 = D1 Function

MB Holding Register 15, Address: h14	D1 (digital input) Function
Function for D1 0 = OFF, 1 = Enable (Default), 3 = Limit, 5 = Set Intern2, 6 = Set Intern3, 13 = change direction of rotation, 15 = Firealarm 1, 19 = Firealarm 2	
Access / necessary PIN protection level	RW, NV / [2]
minimal value	0
maximum value	19
Default	1
Bit [15:0]	Decimal value 0 - 65535

3.5.6 MB Holding Register 16, Address: h15 = K1 Function

MB Holding Register 16, Address: h15	K1 (Relays) function
Function for K1 0: OFF, 1: Operation, 2: Fault (Default), 4: Speed limit ON = (Speed > Set Intern3 & Operation) Hyst = 50 rpm, 17: Control - Bit 15 (h1), 20: fault indication or indication for active temperature management	
Access / necessary PIN protection level	RW, NV / [2]
minimal value	0
maximum value	20
Default	2
Bit [15:0]	Decimal value 0 - 65535

3.5.7 MB Holding Register 17, Address: h16 = Controller Setup Flags

MB Holding Register 17, Address: h16	Controller Setup Flags	
Access / necessary PIN protection level	RW, NV / [2]	
minimal value	0	
maximum value	65535	
Default	513	
Bit [15]	Blocking protection repeat tries: 0 = 5 tries (default), 1 = no repeat tries	
Bit [14]	Blocking protection change direction of rotation: 0 (default), 1 = change direction of rotation by each repeat try	
Bit [13]	0 = Motorheating normal (Default), 1 = Motorheating suppressed	
Bit [12:11]	Switching frequency of the output stage 0 = 16 kHz FIX (default) 1 = 8 kHz FIX 2 = 8 kHz auto switching by temperature 3 = 8 kHz auto switching by setting	
Bit [10]	Tacho out 0: OFF (default, LED output) 1: ON (display frequenzy, n = 60 x f)	
Bit [9:8] **Information** Settings are not saved until after a Reset (h0 = PIN 2143) or switching ON/OFF. For register with necessary PIN protection level [3] administrator PIN necessary.	Default PIN Protectlevel	
	[0]	For register with necessary PIN Protect level [1] or [2] PIN input for write access necessary.
	[1]	For register with necessary PIN protection level [2] and higher PIN input for wirte access necessary.
	[2]	Write access for register with necessary PIN protection level [1] and [2] (Default).
Bit [7:4]	Setting wirless channel (in combination with communication module type AM-MODBUS-W) Default: 0	

Bit [3:1] **Information** Only for control mode 1, 2, 3 valid	The selected value is copied after a Reset depending on the kind of speed control into the holding register h2 (control). 0: Write 0 (Default) 1: Write Holding Register 5 (NV, Speed1) 2: Write Holding Register 6 (NV, Speed2) 3: Write Holding Register 9 (NV, Speed3) 4: Write Holding Register 8 (NV, Max. Speed) 5: Write last speed (h2, saved at a power failure)
Bit [0]	LED Mode 0: OFF 1: Run / Fault indication by blink codes (Default)

3.5.8 MB Holding Register 18, Address: h17 = communication / control signal watchdog

MB Holding Register 18, Address: h17	**Communication Watchdog**
Communication watchdog defines a behavior in case of a communication failure / control signal failure. If the device receives no message or if the control signal is disturbed in a time window, the device will execute the selected function.	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	0
Bit [15:8]	Watchdog time in seconds (Default 0 = off)
Bit [7:0]	Watchdog Mode: 0: no function (default) = OFF 1: Fault (K1 function, h15) in case of communication fault (WDT) 2: Constant speed 1 * in case of communication fault (WDT) 3: Fault + constant speed 1 * in case of communication fault (WDT) 4: Fault E1 Fault** 5: Constant speed 1 by E1 failure 6: Failure constant speed 1 by E1 failure 7: Switch over to E1 * at communication failure (WDT) 8: Failure + Switch over to E1* at communication failure (WDT)
* in this condition it is possible by digital input function 5, 6 or digital control function to change between the constant speeds (Holding register h4). ** E1 fault is triggered when E1 falls below E1 Min x 0.5. E1 fault is cancelled when E1 rises above E1 Min x 0.9.	

3.5.9 MB Holding Register 19, Address: h18 = Limit

MB Holding Register 19, Address: h18	**Limit: %**
Speed limit when activated by a digital control function.	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	100
Default	75
Bit [15:0]	Decimal value 0 - 65535

3.5.10 MB Holding Register 20, Address: h19 = Radio network code

MB Holding Register 20, Address: h19	Radio network code
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	9999
Default	9999
Bit [15:0]	Decimal value 0 - 65535

3.6 Motor Setup

3.6.1 MB Holding Register 26, Address: h25 = Ramp timing

MB Holding Register 26, Address: h25	Ramp timing
factory settings configuration	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Bit [15:8]	Rampdown time / s, e. g. ECblue 116 = 20 *
Bit [7:0]	Rampup time / s, e. g. ECblue 152 = 20 *

* depending on device type

Register 20 - 24 and 26 - 29 holds factory settings that should not be changed!

3.7 Speed range suppression

3.7.1 MB Holding Register 31, Address: h30 = Suppression

MB Holding Register 31, Address: h30	Suppression
Activation of max. 3 speed suppression ranges	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	0
Bit [15:3]	no function, reads 0
Bit [2]	1: Speed suppression range 3 active 0: Speed suppression range 3 deactivated
Bit [1]	2: Speed suppression range 2 active 0: Speed suppression range 2 deactivated
Bit [0]	1: Speed suppression range 1 active 0: Speed suppression range 1 deactivated

3.7.2 MB Holding Register 32, Address: h31 = Range1 Min.: 1/min

MB Holding Register 32, Address: h31	Range1 min.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.7.3 MB Holding Register 33, Address: h32 = Range1 Max.: 1/min

MB Holding Register 33, Address: h32	Range1 Max.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	100
Bit [15:0]	Decimal value 0 - 65535

3.7.4 MB Holding Register 34, Address: h33 = Range2 Min.: 1/min

MB Holding Register 34, Address: h33	Range2 Min.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	200
Bit [15:0]	Decimal value 0 - 65535

3.7.5 MB Holding Register 35, Address: h34 = Range2 Max.: 1/min

MB Holding Register 35, Address: h34	Range2 Max.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	300
Bit [15:0]	Decimal value 0 - 65535

3.7.6 MB Holding Register 36, Address: h35 = Range3 Min.: 1/min

MB Holding Register 36, Address: h35	Range3 Min.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	500
Bit [15:0]	Decimal value 0 - 65535

3.7.7 MB Holding Register 37, Address: h36 = Range3 Max.: 1/min

MB Holding Register 37, Address: h36	Range3 Max.: 1/min
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	20000
Default	600
Bit [15:0]	Decimal value 0 - 65535

3.7.8 MB Holding Register 38, Adress: h37 = Fan Bad

MB Holding Register 38, Address: h37	Fan Bad
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Bit [15:8]	Time delay / s *
Bit [7:0]	Speed deviation 1 / min *

* *The function is switched off if one of these two values is "0". "0" is the factory setting in the standard versions.*

The factory settings of the Holding Register h38 - h39 should not be changed!

3.8 Internal PI controller settings

The factory settings of the Holding Register h40 - h49 may not be changed!

3.9 Antiblock protection

3.9.1 MB Holding Register 51, Address: h50 = repeat tries

MB Holding Register 51, Address: h50	Repeat tries
Number of retries with blocked motor. Register value is only used if h16 Bit 15=0	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	5
Bit [15:0]	Decimal value 0 - 65535

3.9.2 MB Holding Register 52, Address: h51 = running time and mode

MB Holding Register 52, Address: h51	Running time and mode
Bit [15:8] antiblock protection minimum running time [h]; Bit [7:0] antiblock protection mode	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	1537
Bit [7:0]	Antiblock protection mode 0: Monitoring via IGBT temperature OFF 1: Monitoring via IGBT temperature ON
Bit [15:8]	Antiblock running time [h] Decimal value 0 - 65535

3.9.3 MB Holding Register 53, Address: h52 = Activation temperature (IGBT)

MB Holding Register 53, Address: h52	Activation temperature (IGBT)
When the temperature falls below this value, the antiblock protection (motor heating with slowly rotating motor) is activated. 200 = 20.0 °C	
Access / necessary PIN protection level	RW, NV / 2
minimal value	-20
maximum value	120
Default	30
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.9.4 MB Holding Register 54, Address: h53 = Deactivation temperature (IGBT)

MB Holding Register 54, Address: h53	Deactivation temperature (IGBT)
If this temperature is exceeded, the antiblock protection (motor heating with slowly rotating motor) is deactivated when the minimum runtime h51 Bit [15:8] has elapsed. 200 = 20.0 °C	
Access / necessary PIN protection level	RW, NV / 2
minimal value	-20
maximum value	120
Default	50
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.9.5 MB Holding Register 55, Address: h54 = Activation temperature (inside temperature)

MB Holding Register 55, Address: h54	Activation temperature (inside temperature)
When the temperature falls below this value, the antiblock protection (motor heating with slowly rotating motor) is activated. 200 = 20.0 °C	
Access / necessary PIN protection level	RW, NV / 2
minimal value	-40
maximum value	120
Default	65346
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.9.6 MB Holding Register 56, Address: h55 = deactivation temperature (inside temperature)

MB Holding Register 56, Address: h55	Deactivation temperature (inside temperature)
If this temperature is exceeded, the antiblock protection (motor heating with slowly rotating motor) is deactivated when the minimum runtime h51 Bit [15:8] has elapsed. 200 = 20.0 °C	
Access / necessary PIN protection level	RW, NV / 2
minimal value	-40
maximum value	120
Default	65386
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.10 Vibration velocity

3.10.1 MB Holding Register 61, Address: h60 = warning limit x-axis

MB Holding Register 61, Address: h60	Warning limit X-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.2 MB Holding Register 62, Address: h61 = warning limit Y-axis

MB Holding Register 62, Address: h61	Warning limit Y-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.3 MB Holding Register 63, Address: h62 = warning limit Z-axis

MB Holding Register 63, Address: h62	Warning limit Z-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.4 MB Holding Register 64, Address: h63 = delay time warning X-axis

MB Holding Register 64, Address: h63	Delay time warning X-axis
Delay time until a warning is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.10.5 MB Holding Register 65, Address: h64 = delay time warning Y-axis

MB Holding Register 65, Address: h64	Delay time warning Y-axis
Delay time until a warning is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.10.6 MB Holding Register 66, Address: h65 = delay time warning Z-axis

MB Holding Register 66, Address: h65	Delay time warning Z-axis
Delay time until a warning is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.10.7 MB Holding Register 67, Address: h66 = failure limit X-axis

MB Holding Register 67, Address: h66	Error limit X-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.8 MB Holding Register 68, Address: h67 = failure limit Y-axis

MB Holding Register 68, Address: h67	Error limit Y-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.9 MB Holding Register 69, Address: h68 = failure limit Z-axis

MB Holding Register 69, Address: h68	Error limit Z-axis: mm/s
Value of the 1st order. 2 decimal places 500 = 5.00 mm/s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0.00
maximum value	655.35
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.10.10 MB Holding Register 70, Address: h69 = delay time failure X-axis

MB Holding Register 70, Address: h69	Delay time warning X-axis
Delay time until a failure indication is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.10.11 MB Holding Register 71, Address: h70 = delay time failure Y-axis

MB Holding Register 71, Address: h70	Delay time failure Y-axis
Delay time until a failure indication is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.10.12 MB Holding Register 72, Address: h71 = delay time failure Z-axis

MB Holding Register 72, Address: h71	Delay time failure Z-axis
Delay time until a failure indication is issued if the vibration velocity is too high. Time in s	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	15
Bit [15:0]	Decimal value 0 - 65535

3.11 Air flow

3.11.1 MB Holding Register 81, Address: h80 = maximum volume flow

MB Holding Register 81, Address: h80	**maximum volume flow**
This value is 100 % default	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.11.2 MB Holding Register 85, Address: h84 = volume flow adjustment

MB Holding Register 85, Address: h84	**maximum volume flow**
Adjustment of the measured sensor value	
Access / necessary PIN protection level	RW, NV / 2
minimal value	-32767
maximum value	32767
Default	0
Bit [15:0]	Decimal value 0 - 65535

3.12 Lifetime

3.12.1 MB Holding Register 82, Address: h81 = warning limit lifetime

MB Holding Register 82, Address: h81	Warning limit
If the service life falls below the limit value, an error message is output. Unit hours [h] h81 = 0: Warning deactivated; h81 > 0: Warning activated	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	0
Bit [15:0]	0: deactivated

3.12.2 MB Holding Register 83, Address: h82 = failure limit lifetime

MB Holding Register 83, Address: h82	Failure limit
If the service life falls below the limit value, an failure message is output. Unit hours [h] h82 = 0: Warning deactivated; h82 > 0: Warning activated	
Access / necessary PIN protection level	RW, NV / 2
minimal value	0
maximum value	65535
Default	0
Bit [15:0]	0: deactivated

3.13 Info, monitoring and diagnostic

3.13.1 MB Input Register 1, Address: i0 = Firmware

MB Input Register 1, Address: i0	Firmware
Firmware version number xx.xx (index version)	
Access	R
minimal value	0.00
maximum value	655.35
Bit [15:0]	Decimal value 0 - 65535

3.13.2 MB Input Register 2, Address: i1 = Product code 1

MB Input Register 2, Address: i1	Product code 1 (Controller Code)
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Product Code of the device (Hex) MSB Family, LSB Variante ECblue 116/152 2nd generation = 0x0101

3.13.3 MB Input Register 3, Address: i2 = Parameterset ID

MB Input Register 3, Address: i2	Parameterset ID
Display of parameterset ID	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.4 MB Input Register 4-9, Address: i3 - i8 = Unique Device Signature 0 - 5

MB Input Register 4-9, Address: i3 - i8	Unique Device Signature 0 - 5
6 16-Bit Register to read unique device signature. LSW = 0	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.5 MB Input Register 10, Address: i9 = Parameterset index

MB Input Register 10, Address: i9	Parameterset Index
Display of parameterset index	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.6 MB Input Register 11, Address: i10 = Operation condition 1

MB Input Register 11, Address: i10	Operation condition 1
Display operating conditions	
Access	R
minimal value	0
maximum value	65535
Bit [15]	1: Fan Bad
Bit [14]	1: Reverse active
Bit [13]	1: Temp. alarm inside
Bit [12]	1: Temp. alarm IGBT
Bit [11]	1: DC-link overvoltage
Bit [10]	1: K1 status
Bit [9]	1: E1 digital status
Bit [8]	1: D1 state
Bit [7]	1: DC Current limit
Bit [6]	1: Field weakening
Bit [5]	1: Fire alarm
Bit [4]	1: Wrong direction of rotation
Bit [3]	1: Internal system error
Bit [2]	1: IGBT FAULT CHECK
Bit [1]	1: Temperature management
Bit [0]	1: STOP

3.13.7 MB Input Register 12, Address: i11 = Operation condition 2

MB Input Register 12, Address: i11 (from FW 14)	Operation condition 2
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Bit [15..8] is set if a warning in the corresponding warning group occurs (collective error). A warning group is, for example, User Application System Warning. The reason for a group warning message is displayed via bit [7..0]. The prioritisation rules for displaying the warning reasons are as follows: (If several warning bits are set at the same time, the warning reason with the lowest number is displayed) 1. [i11.Bit15] Functional Safety - Fail Safe Mode 2. [i11.Bit13] User Application System Failure 3. [i11.Bit12] Warnung Schwingungswerte 4. [i11.Bit14] Motorcontrol System Failure 5. [i11.Bit8] Limit 6. [i11.Bit9] Direction 7. [i11.Bit11] Lifetime
Bit [15]	**Functional Safety - Warning** Reason 0: unkown / invalid Reason 1: test statemachine failure Reason 2: variable test failure Reason 3: test control flow failure Reason 4: safety parameter settings failure Reason 5: current sensor plausibitity test (sum) failure Reason 6: division by 0 failure Reason 7: voltage sensor plausibility test failure Reason 8: dc link voltage test failure Reason 9: motorcurrent test failure Reason 10: temperature sensor plausibility failure Reason 11: temperature tests failure Reason 12: configuration register test failure
Bit [14]	**Motorcontrol System Warning** Reason 0: unknown Reason 1: current sensor adjustment Reason 2: parameterisation error Reason 3: motor blocked (Blocking protection - breakaway procedure active)
Bit [13]	**User Application System Warning** Reason 0: unknown Reason 1: motorcontrol selection failure Reason 2: parameter set CRC failure Reason 3: parameter set lifetime failure
Bit [12]	**Warning vibration values** Reason 0: unknown Reason 1: X-axis Reason 2: Y-axis Reason 3: X-axis + Y-axis Reason 4: Z-axis Reason 5: X-axis + Z-axis Reason 6: Y-axis + Z-axis Reason 7: X-axis + Y-axis + Z-axis
Bit [11]	**Warning Lifetime**
Bit [10]	Reserved

Bit [9]	**Direction** Reason 0: unknown Reason 1: wrong direction
Bit [8]	**Limit** Reason 0: unknown Reason 1: current limitation Reason 2: voltage limitation Reason 3: power limitation Reason 4: temperature limitation Reason 5: overload limitation
Bit [7:0]	**Warning Reason Code** A code that indicates the reason for a warning message in operating state 2 (i11) bit [15..8]. In the event of several errors, the code of the highest-priority error is displayed.

3.13.8 MB Input Register 13, address: i12 = error status

MB Input Register 13, Address: i12	**Error status**
Display Error status	
Access	R
minimal value	0
maximum value	65535
Bit [15]	1: COM error (Watchdog) Reason = 0
Bit [14]	1: Motor Start Reason 1: braking not possible (break current to high) Reason 2: rotation speed to high
Bit [13]	1: Temperature error Reason 1: IGBT Reason 2: ELKO Reason 3: MCU Reason 4: Motor Reason 5: Sinefilter Reason 6: Choke Reason 7: T7 Reason 8: T8
Bit [12]	1: Safety Shutdown Reason = 0
Bit [11]	1: Sinefilter (only Fcontrol) Reason = 0 ☞ temperature fault
Bit [10]	1: PEAK CURRENT Reason 1: Max. Peak Reason 2: I^2t
Bit [9]	1: MOTOR BLOCKED Reason 1: Motor blocked
Bit [8]	1: HALLSENSOR Reason 1: Angle error
Bit [7]	1: TB (reserved for PMblue etc.) Reason 1: Thermostats
Bit [6]	1: LINE FAULT Reason 1: Phase failure Reason 2: Line failure
Bit [5]	1: UIN LO Reason 1: Uin too low
Bit [4]	1: UIN HI Reason 1: Uin too high

Bit [3]	1: UZK LO Reason 1: Uzk to low
Bit [2]	1: UZK HI Reason 1: Uzk to high Reason 2: Uzk buffer too high
Bit [1]	1: EARTH TO GROUND FAULT Reason 1: IGBT Fault Signal Reason 2: Current sum
Bit [0]	1: IGBT FAULT Reason 1: IGBT Fault Signal Reason 2: IGBT Driver Ready

3.13.9 MB Input register 14, address: i13: failure status 2

MB Input Register 14, Address: i13	**Error status 2**
Access	R
minimal value	0
maximum value	65535
Bit [15:8]	Bit [15..8] is set if an error in the corresponding error group occurs (collective error). An error group is, for example, User Application System Failure. The reason for a group error message is displayed via bit [7..0]. Bit [7..0] also gives the reasons for errors that are reported with error state 1 (i12). The prioritisation rules for displaying the error reasons are as follows: (If several error bits are set at the same time, the warning reason with the lowest number is displayed) 1. [i13.Bit 15] Functional Safety - Fail Safe Mode 2. [i13.Bit13] User Application System Failure 3. [i12.Bit12] Error vibration values 4. [i13.Bit14] Motorcontrol System Failure 5. [i12.Bit7] TB 6. [i12.Bit0] IGBT FAULT 7. [i12.Bit1] SHORTCUT EARTH 8. [i12.Bit13] Temperature Error 9. [i12.Bit9] MOTOR BLOCKIERT 10. [i12.Bit8] PHASENAUSFALL (LINE) 11. [i12.Bit8] HALLSENSOR 12. [i12.Bit10] PEAK CURRENT 13. [i12.Bit2] UZK HI 14. [i12.Bit3] UZK LO 15. [i12.Bit4] UIN Hi 16. [i12.Bit5] UIN LO 17. [i13.Bit8] Limit 18. [i13.Bit9] Direction 19. [i12.Bit14] Motor Start 20. [i12.Bit15] COM error (Watchdog) 21. [i12.Bit11] Sinefilter 22. [i12.Bit12] Safety Shutdown 23. [i11.Bit11] Error lifetime

Bit [15]	**Functional Safety - Fail Safe Mode** Reason 0: unkown / invalid Reason 1: test statemachine failure Reason 2: variable test failure Reason 3: test control flow failure Reason 4: safety parameter settings failure Reason 5: current sensor plausibitity test (sum) failure Reason 6: division by 0 failure Reason 7: voltage sensor plausibility test failure Reason 8: dc link voltage test failure Reason 9: motorcurrent test failure Reason 10: temperature sensor plausibility failure Reason 11: temperature tests failure Reason 12: configuration register test failure
Bit [14]	**Motorcontrol System Warning** Reason 0: unknown Reason 1: current sensor adjustment Reason 2: Parameterisation error Reason 3: Motor blocked (Blocking protection - breakaway procedure failed)
Bit [13]	**User Application System Failure** Reason 0: unknown Reason 1: Motorcontrol selection failure Reason 2: Parametersatz CRC failure Reason 3: Parametersatz lifetime failure
Bit [12]	**Warning vibration values** Reason 0: unknown Reason 1: X-axis Reason 2: Y-axis Reason 3: X-axis + Y-axis Reason 4: Z-axis Reason 5: X-axis + Z-axis Reason 6: Y-axis + Z-axis Reason 7: X-axis + Y-axis + Z-axis
Bit [11]	**Warning Lifetime**
Bit [10]	Reserved
Bit [9]	**Direction** Reason 0: unknown Reason 1: wrong direction
Bit [8]	**Limit** Reason 0: unknown Reason 1: current limitation Reason 2: voltage limitation Reason 3: power limitation Reason 4: temperature limitation Reason 5: overload limitaion
Bit [7:0]	**Failure Reason Code** A code that indicates the reason for an error message in error state 1 (i12) and error state 2 (i13) bit [15..8]. In the event of several errors, the code of the highest-priority error is displayed.

3.13.10 MB Input Register 15, Address: i14 = Speed

MB Input Register 15, Address: i14	Speed: 1/min
Display actual speed	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.11 MB Input Register 16, Address: i15 = Motorcurrent

MB Input Register 16, Address: i15	Motorcurrent: A
Display motor current	
Access	R
minimal value	0.00
maximum value	655.35
Bit [15:0]	Decimal value 0 - 65535 (in 0.01 A steps)

3.13.12 MB Input Register 21, Address: i20 = DC voltage

MB Input Register 21, Address: i20	DC Voltage: V
Display DC LINK voltage	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535 (in 1 V steps)

3.13.13 MB Input Register 22, Addresse: i21 = Line voltage

MB Input Register 22, Address: i21	Line voltage: V
Display supply voltage (peak value)	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535 (in 1 V steps)

3.13.14 MB Input Register 23, Address: i22 = IGBT-temperature

MB Input Register 23, Address: i22	IGBT-Temperature: °C
Display IGBT temperature 200 = 20.0 °C	
Access	R
minimal value	-50
maximum value	150
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.13.15 MB Input Register 24, Addresse: i23 = inside temperature

MB Input Register 24, Address: i23	**inside Temperature: °C**
Display ambient temperature of electronics insde housing 200 = 20.0°C	
Access	R
minimal value	-50
maximum value	150
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.13.16 MB Input Register 25, Address: i24 = MCU temperature

MB Input Register 25, Address: i24	**MCU Temperature: °C**
Display Chip temperature 200 = 20.0 °C	
Access	R
minimal value	-50
maximum value	150
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.13.17 MB Input Register 27, Address: i26 = E1 input

MB Input Register 27, Address: i26	**E1 Input**
Display of connected voltage at anlalog input E1 (0 - 10 V or PWM) as raw value. 0 to 32767 = 0 - 10 V or/and 0 - 100 % PWM	
Access	R
minimal value	0
maximum value	32767
Bit [15:0]	Decimal 0 - 32767 (Fractional)

3.13.18 MB Input Register 28, Address: i27 = Modulation

MB Input Register 28, Address: i27	**Control**
Display fan level of speed controller 0 to 32767 = 0 - 100 %	
Access	R
minimal value	0
maximum value	32767
Bit [15:0]	Decimal 0 - 32767 (Fractional)

3.13.19 MB Input register 30, address: i29 = MSW Event

MSW = most significant word

MB Input register 30, address: i29	MSW Event
Event log entry according to Register error status (i13). Selection of entry 1 - 10 by entering command code 7500 - 7509.	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Error status

3.13.20 MB Input register 31, address: i30 = LSW Event

LSW = least significant word

MB Input Register 31, Address: i30	LSW Event
Event log entry according to Register error status (i12). Selection of entry 1 - 10 by entering command code 7500 - 7509.	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Error status

3.13.21 MB Input Register 32, Address: i31 = Event number

MB Input Register 32, Address: i31	Event number
Item of selected event log entry.	
Access	R
minimal value	0
maximum value	1000
Bit [15:0]	Decimal

3.13.22 MB Input Register 33, Address: i32 = power factor

MB Input Register 33, Address: i32	Power factor
Cos(Phi) at inverter output	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	0 - 65535

3.13.23 MB Input Register 34, Address: i33 = Motor input power

MB Input Register 34, Address: i33	Motor input power: W
Display of motor input power in watts	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535 (in 1 W steps)

3.13.24 MB Input register 39, address: i38 = LSW operation time

MB Input Register 39, Address: i38	LSW operation time
LSW of the operating hours counter	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.25 MB Input register 40, address: i39 = MSW operation time

MB Input Register 40, Address: i39	MSW operation time
MSW of the operating hours counter	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.26 MB Input Register 41, Address: i40 = reactor temperature

MB Input Register 41, Address: i40	Temperature reactor
Temperature at the input reactor (200 = 20.0 °C)	
Access	R
minimal value	-50
maximum value	150
Bit [15:0]	Decimal value 0 - 65535 (in 0.1 °C steps)

3.13.27 MB Input Register 43, Address: i42 = LSW air flow

MB Input Register 43, Address: i42	LSW air flow
LSW of the calculated air flow	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.28 MB Input Register 44, Address: i43 = MSW air flow

MB Input Register 44, Address: i43	MSW air flow
MSW of the calculated air flow	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65535

3.13.29 MB Input Register 46, Address: i45 = Motor voltage

MB Input Register 46, Address: i45	Motor voltage
Effective motor voltage 2000 = 200.0 V	
Access	R
minimal value	0.0
maximum value	6553.5
Bit [15:0]	Decimal value 0 - 6553.6

3.13.30 MB Input Register 48, Address: i47 = Motorcurrent phase U

MB Input Register 48, Address: i47	Motor current phase U
Maximum value of the current in phase U 2000 = 2.00 A	
Access	R
minimal value	0.00
maximum value	655.36
Bit [15:0]	Decimal value 0 - 65536

3.13.31 MB Input Register 49, Address: i48 = Motorcurrent phase V

MB Input Register 49, Address: i48	Motor current phase V
Maximum value of the current in phase V 2000 = 2.00 A	
Access	R
minimal value	0.00
maximum value	655.36
Bit [15:0]	Decimal value 0 - 65536

3.13.32 MB Input Register 50, Address: i49 = Inquiry PIN protect level

MB Input Register 50, Address: i49	Inquiry PIN Protectlevel
Access	R
minimal value	0
maximum value	3
Bit [15:0]	Decimal
Setting access authorization ☞h16	

3.13.33 MB Input Register 51, Address: i50 = Remaining lifetime

MB Input Register 51, Address: i50	Remaining lifetime
Remaining lifetime in hours	
Access	R
minimal value	0
maximum value	65535
Bit [15:0]	Decimal value 0 - 65536

3.13.34 MB Input Register 56, Address: i55 = Motor installation position

MB Input Register 56, Address: i55	Motor installation position
Installation position of the motor: 0 = vertical installation (motor shaft horizontal); 1 = horizontal installation (motor shaft vertical)	
Access	R
minimal value	0
maximum value	1
Bit [15:0]	Decimal value 0 - 65536

3.13.35 MB Input Register 60, Address: i59 = vibration velocity X-axis [1st order]

MB Input Register 60, Address: i59	Vibration velocity X-axis [1st order]
Vibration velocity in direction of the X-axis of the motor (1st order): mm/s*100	
Access	R
minimal value	0
maximum value	655.35
Bit [15:0]	Decimal value 0 - 65535

3.13.36 MB Input Register 61, Address: i60 = vibration velocity Y-axis [1.st order]

MB Input Register 61, Address: i60	Vibration velocity Y-axis [1.st order]
Vibration velocity in direction of the Y-axis of the motor (1.st order): mm/s*100	
Access	R
minimal value	0
maximum value	655.35
Bit [15:0]	Decimal value 0 - 65535

3.13.37 MB Input Register 62, Address: i61 = vibration velocity Z-axis [1.st order]

MB Input Register 62, Address: i61	Vibration velocity Z-axis [1.st order]
Vibration velocity in direction of the Z-axis of the motor (1.st order): mm/s*100	
Access	R
minimal value	0
maximum value	655.35
Bit [15:0]	Decimal value 0 - 65535

4 Emergency scenario (error handling)

"DEVICE UNDER TEST" hereinafter referred to as "DUT".
If communication with the DUT is no longer possible due to incorrect setting of the transfer rate or the slave address, or if the communication parameters or the slave address is not recognised, there is an emergency scenario “MODBUS Recovery Function (MRF)”.

Emergency scenario (MODBUS Recovery Function):

- If more than 15 faulty messages (e.g. CRC error) or messages with the slave address 255 are received, the DUT automatically switches to the default communication parameter 19200 Bd / 8E1 and slave address 254.
- In the case of an unknown or wrong baud rate, the switchover to default values already takes place after 15 characters.
- Communication with the DUT can now take place via the slave address 254. If there are several DUTs on the bus, only broadcast commands (slave address 0) can be sent.
- The DUT does not respond to the address 255. The emergency scenario can be restarted following a reset (PIN input, power reset).

Recommended sequence for the emergency scenario

(A) Individual devices or devices which can be switched on and off individually:

1. Connect test tool (MODBUS Master), e.g. MODBUS Poll, to the bus.
2. Set MODBUS master to default values 19,200 bps and 8E1 and initiate request to fan with address 255. Poll interval typically 500 ms.
3. Switch on DUT.
4. If the DUT recognises more than 15 MODBUS requests from the master on address 255, it switches to emergency operation(1) and automatically loads the default settings.
   Default settings:
   – Baudrate: 19200(2)
   – Parity: 8E1
   – Device address: 254 (MODBUS Recovery Function active)
5. If the slave address on MODBUS master is set to 254, all registers can be read out and set in the DUT.
6. In the corresponding Holding Register, set the address / baud rate / parity.
7. Perform a reset, e.g. switch power supply off and on again.
8. DUT can now be re-addressed with the values set under 6), values can be read and written.

If it is not possible to energise a DUT individually, the procedure described below must be followed:

(B) Several devices in the network which cannot be switched on and off individually:(2)

1. Connect test tool (MODBUS Master), e.g. MODBUS Poll, to the bus.
2. Switch on DUT.
3. Set MODBUS master to default values 19,200 bps and 8E1 and initiate request to fan with address **255**. Poll interval typically 500 ms.
4. If the DUT recognises more than 15 MODBUS requests from the master on address 255, it switches to the MODBUS Recovery Function and automatically loads the default settings.
   Default settings:
   – Baudrate: 19200(2)
   – Parity: 8E1
   – Device address: 254 (MODBUS Recovery Function active)
5. Adjust the interface settings of the "DUT" and the MODBUS slave address via a broadcast command. **All DUTs have the same address e.g. 247 and the same communication parameters!**
6. Perform a reset, e.g. switch power supply off and on again.
7. Perform auto-addressing. The DUTs can now be addressed using the previously configured values. After successful auto-installation,(2) the values of the DUTs can be read and written directly.

(1)

In the case of an unknown or wrong baud rate, the switchover to default values already takes place after 15 characters!

(2)

This scenario is only useful if the devices support the ZIEHL-ABEGG auto-addressing!

5 Enclosure

5.1 Manufacturer reference CE

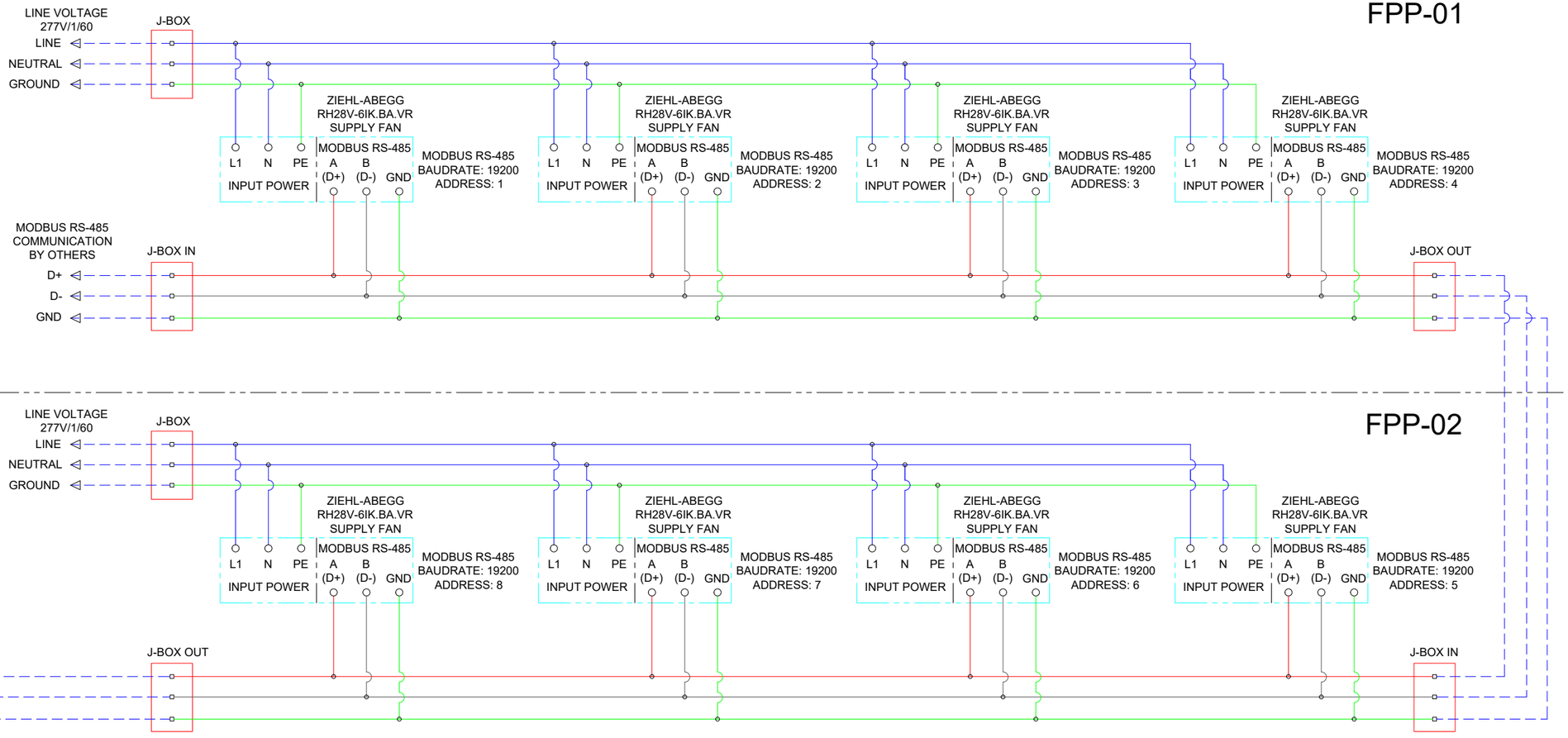
Our products are manufactured in accordance with the relevant international regulations. If you have any questions concerning the use of our products or plan special uses, please contact:

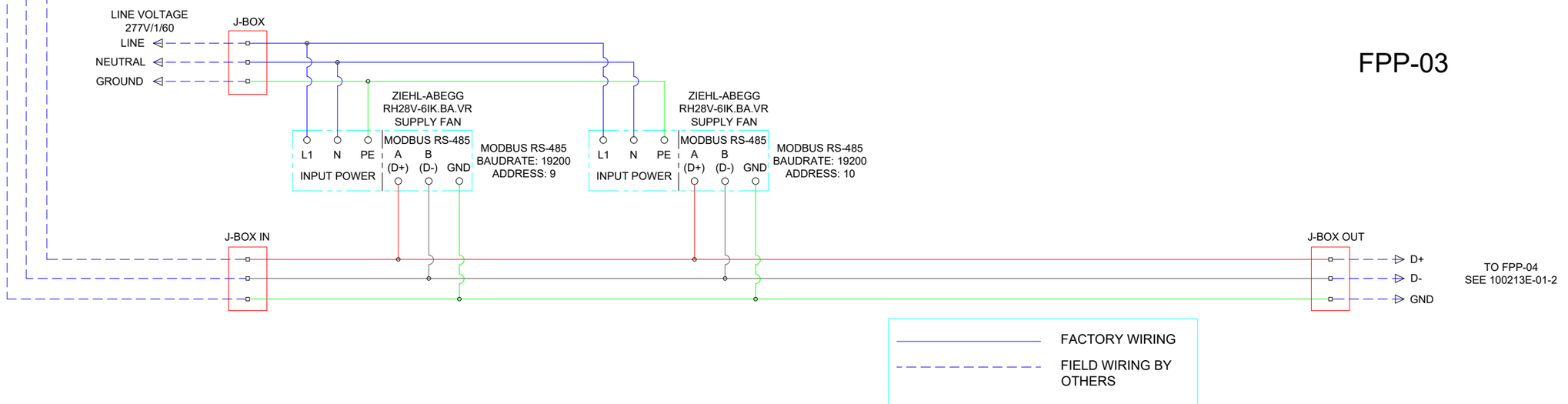
ZIEHL-ABEGG SE
Heinz-Ziehl-Straße
74653 Künzelsau
phone: +49 (0) 7940 16-0

info@ziehl-abegg.de
http://www.ziehl-abegg.com

WIRING DIAGRAMS

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

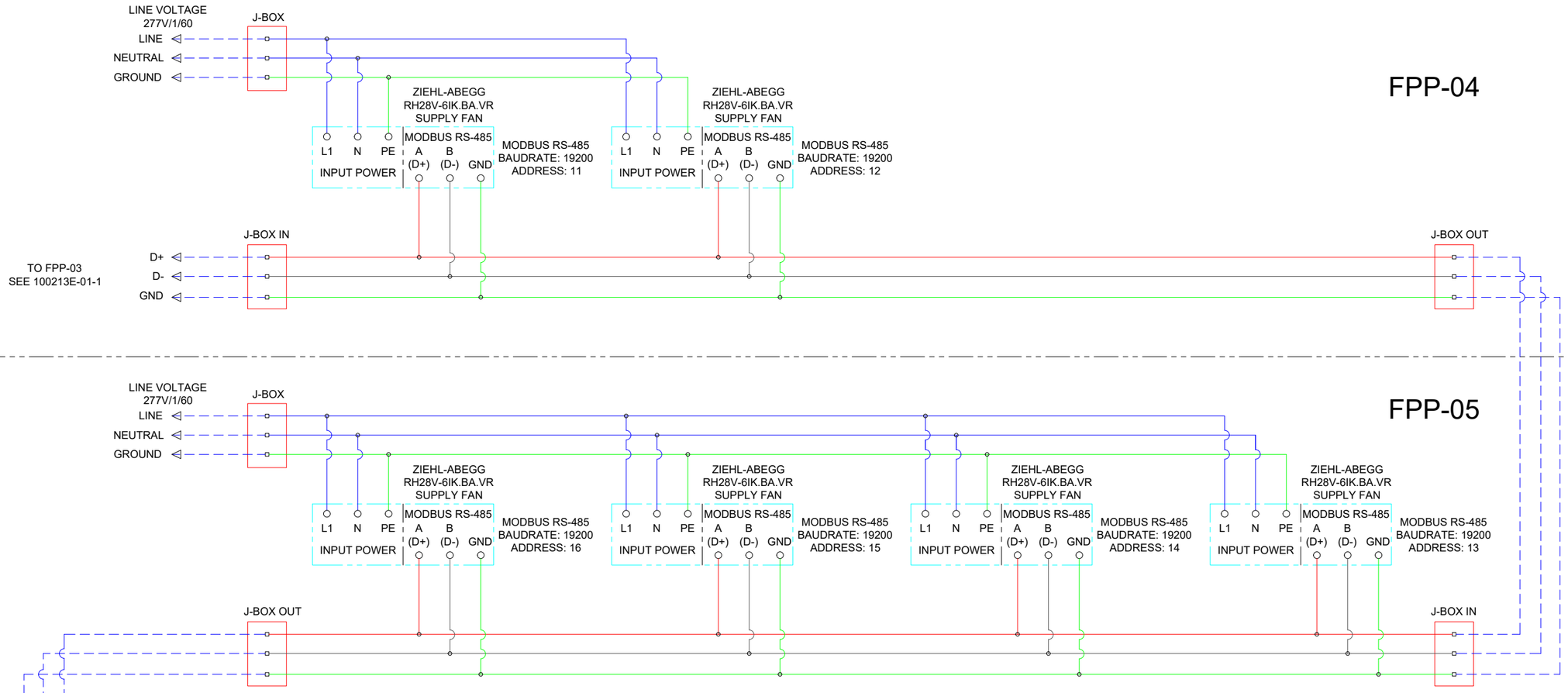




REV	REVISION DESCRIPTION	DESIGNER	DATE
B	As-Built Wiring	AMS	12/13/2024
A	Revised Modbus Field Wiring	AMS	12/4/2024

AJMFG.
9311 TROOST AVE. STE 400 KANSAS CITY MO 64131
PH: 816.231.5522 FAX: 816.231.8437
TOLL FREE: 800.247.5746
WWW.AJMFG.COM

DESIGNED BY: AMS	DATE: 11/22/2024
SALESPERSON: -	REVISION: B
TAG: -	QUANTITY: -
MATERIAL TYPE: -	FINISH: -
ORDER DIMENSION (W x H x D): 225 X 96 X 34	
PRODUCT: FAN POWERED PLENUM	
JOB NAME: B28 SUSTAINABILITY	
DRAWING NO: 100213E-01-1	
QUOTE NO: -	
SALES ORDER NO: 100213	
SHEET SCALE: -	SHEET NO: ES 1 OF 3



REV	REVISION DESCRIPTION	DESIGNER	DATE
B	As-Built Wiring	AMS	12/13/2024
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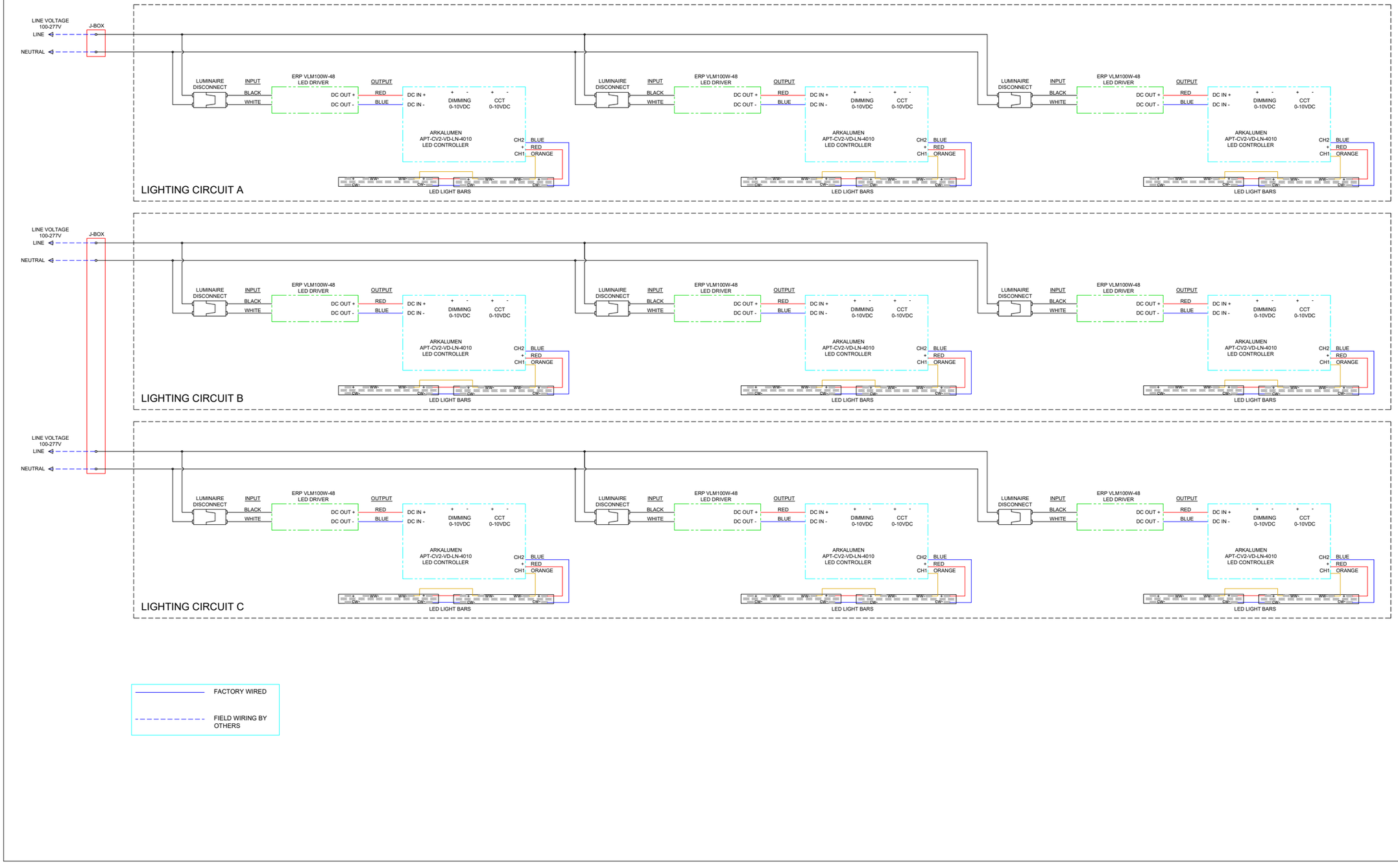
WWW.AJMFG.COM

DESIGNED BY: AMS	DATE: 11/22/2024
SALESPERSON: -	REVISION: B
TAG: -	QUANTITY: -
MATERIAL TYPE: -	FINISH: -
ORDER DIMENSION (W x H x D): 225 X 96 X 34	
PRODUCT: FAN POWERED PLENUM	
JOB NAME: B28 SUSTAINABILITY	
DRAWING NO: 100213E-01-2	
QUOTE NO: -	
SALES ORDER NO: 100213	
SHEET SCALE: -	SHEET NO: ES 2 OF 3



REV	REVISION DESCRIPTION	DESIGNER	DATE
B	As-Built Wiring	AMS	12/13/2024
A	Revised Modbus Field Wiring	AMS	12/4/2024

AJMFG.
9311 TROOST AVE. STE 400 KANSAS CITY MO 64131
PH: 816.231.5522 FAX: 816.231.8437
TOLL FREE: 800.247.5746
WWW.AJMFG.COM

DESIGNED BY: AMS	DATE: 12/13/2024
SALESPERSON: -	REVISION: -
TAG: -	QUANTITY: -
MATERIAL TYPE: -	FINISH: -
ORDER DIMENSION (W x H x D): 225 X 96 X 34	
PRODUCT: FAN POWERED PLENUM	
JOB NAME: B28 SUSTAINABILITY	
DRAWING NO: 100213E-01-3	
QUOTE NO: -	
SALES ORDER NO: 100213	
SHEET SCALE: -	SHEET NO: ES 3 OF 3

FILTER DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

Description	Size (H x W x D)	Capacity (CFM)	Shipping Weight	Part Number	Customer PN
QX-20.12-41.12-5-41-VU-1D-11-0	20-1/8 X 41-1/8 X 3	456	21.96 Lbs	SUBMITTAL	AJ PN-TBD

NOTES:

1. MATERIALS:
   - FILTER MEDIA: MICRO-GLASS FIBER / ACRYLIC RESIN BINDER
   - FRAME: 6063-T5 ANODIZED ALUMINUM
   - SEALANT: FIRE RETARDANT / PHOSPHORUS FREE TWO PART POLYURETHANE
   - GASKET: GEL GENERIC URETHANE UPSTREAM
   - GRILL: WHITE EXPANDED STEEL DOWNSTREAM
   - CENTERBOARD: FIL-1, STRAIGHT CUT TO 18-1/2IN 1 HOLE DRILLED

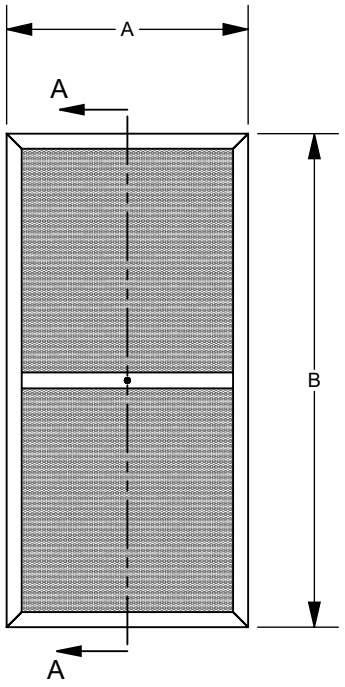
2. TESTING:
   EACH FILTER SHALL BE LEAK TESTED IN ACCORDANCE WITH IEST-RP-CC-034

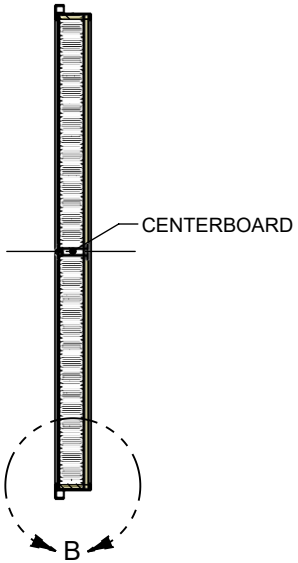
3. FILTER SPECIFICATIONS:
   - FRAME EXTRUSION TYPE: FIL-TLJ3
   - PLEAT DEPTH: 53MM
   - EFFICIENCY: 99.995% MIN VS. MPPS @ 100 FPM USABLE FACE VELOCITY
   - RESISTANCE: 0.52 @ 100 FPM USABLE FACE VELOCITY

4. UL RATING:
   FILTER LISTED AS UL-900

5. FRAME TOLERANCES:
   - LENGTHS: +0.000"/-0.063"
   - DIAGONALS: WITHIN 1/4" TOTAL ALLOWANCE FOR DIAGONALS ≥ 30IN.
     WITHIN 1/8" TOTAL ALLOWANCE FOR DIAGONALS < 30IN.

6. SPECIAL NOTES:
   H14, PROPRIETARY

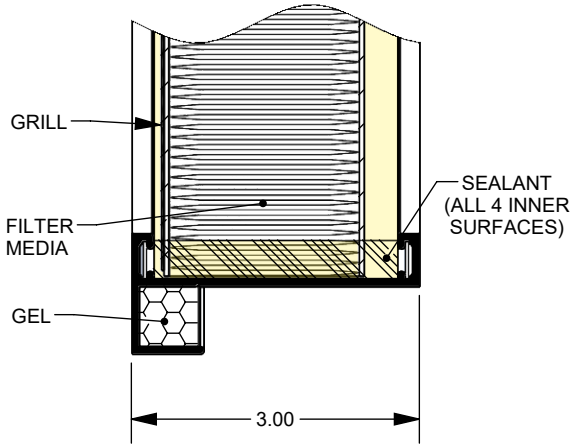




SECTION A-A
SCALE: 1 / 16

←FLOW DIRECTION

DOWNSTREAM UPSTREAM



DETAIL B
SCALE: 1 / 2

CUSTOMER APPROVAL BLOCK

YOUR APPROVAL OF THIS PRINT AUTHORIZES CAMFIL USA INC. TO PROCEED WITH MATERIAL PROCUREMENT, TOOLING AND PRODUCT FABRICATION. ANY CHANGES MADE AFTER APPROVAL MAY INCUR FURTHER EXPENSES TO THE CUSTOMER.

☐ OK AS IS ☐ SEND REVISED DWG.

SIGNATURE/DATE: _____

COMPANY NAME: _____

camfil

DESCRIPTION:
CUSTOM MEGALAM FILTER
53mm

APPROVED BY:	DATE:	DRAWN BY:	DATE:	SHEET	DRAWING NUMBER	REV.
CL	11/21/2024	DW	11/21/2024	1 OF 1	00035909	-

LIGHTING DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

AJ Manufacturing
Cuttable Series 45V

E360509

5 YEAR WARRANTY

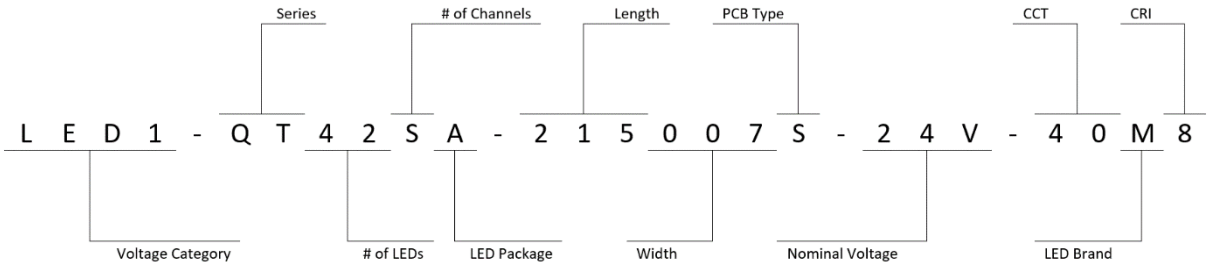
Part Number	Dimensions [Inch]	Typical Current [mA]	Typical Voltage [V]	Typical Light Output [lm]	Efficacy [lm/W]	Max Light Output [lm]
QNC80DT-200005S-45V	20.0" x 0.5"	800	45V	5,585	157	6,555
ENC120DT-300005S-45V	30.0" x 0.5"	1,200	45V	8,375	157	9,835
ENC170DT-425005S-45V	42.5" x 0.5"	1,700	45V	11,865	157	13,935

Warranty Operation Range

Part Number	Max Current [mA]	Operating Temperature Range [°C]	Control Range[1]
QNC80DT-200005S-45V	960	-40.0 to +95.0	100% to 1%
ENC120DT-300005S-45V	1,440		
ENC170DT-425005S-45V	2,040		

1. Control range is dependent on driver resolution.

Order Code



Legend

Voltage Category	LED1: ≤ 24V	LED2: ≤ 42V	LED3: ≤ 60V	**Series**	Q: ≤ 26" Length	E: ≤ 48" Length	T: ≤ 0.7" Width
# of Channels	S: Single Channel	**LED Package**	Internal Code	**Length**	215: ≈ 21.5"	**Width**	007: ≈ 0.7"
PCB Type	S: Aluminium F: FR4	**CCT**	35: 3500K 40: 4000K	**LED Brand**	M: Samsung S: Seoul	**CRI**	8: 80+ 9: 90+

Junction Temperature (T_j): Lumen Multiplication Factor[1]

25°C	45°C	65°C	85°C
1.00	0.97	0.95	0.90

1. Multiplication factors are dependent on the LED brand. Factors in the tables above are for approximation purposes.

AJM Manufacturing
Cuttable Series Light Modules

Electrical Characteristics (T_j = 45 °C)

Part Number	Vf	480mA		960mA		1,440mA		2,040mA	
		Luminous Flux [lm]	Efficacy [lm/W]	Luminous Flux [lm]	Efficacy [lm/W]	Luminous Flux [lm]	Efficacy [lm/W]	Luminous Flux [lm]	Efficacy [lm/W]
QNC80DT-200005S-45V	44.0 – 46.5	3,500	170	6,555	150				
ENC120DT-300005S-45V	44.0 – 46.5	3,565	178	6,845	163	9,835	150		
ENC170DG-425005S-45V	44.0 – 46.5	3,565	182	6,970	172	10,250	161	13,935	150

Optical Characteristics (T_j = 45 °C)

Part Number	LED	CRI	R9	CCT Range
QNC80DT-200005S-45V	BXFN-40G-13H-9D	90	>50	2700K – 6500K
ENC120DT-300005S-45V	BXFN-40G-13H-9D	90	>50	2700K – 6500K
ENC170DG-425005S-45V	BXFN-40G-13H-9D	90	>50	2700K – 6500K

Mechanical Characteristics

Part Number	Dimensions [in]	# of LEDs	Technology	# of Connectors
QNC80DT-200005S-45V	20.0” x 0.5”	WW: 40, CW: 40	Dual Color	4x 1-Pin Poke-In Wire
ENC120DT-300005S-45V	30.0” x 0.5”	WW: 60, CW: 60	Dual Color	4x 1-Pin Poke-in-Wire
ENC170DG-425005S-45V	42.5” x 0.5”	WW: 85, CW: 85	Dual Color	4x 1-Pin Poke-In Wire

Release: AJ Manufacturing Cuttable Series 45V V1.2 (05 12, 2023)

APT-CV2-VD-LN MODULES

Features

- APT-CV2 controllers add advanced control features to standard constant voltage (CV) drivers
- Integrated between the CV driver and LED modules, the DC modules are powered directly from the CV driver
- APT-CV2 controllers provide up to 2 constant current outputs for powering LED channels of varying forward voltages
- Operable for independent control over each output channel and/or control over overall intensity and CCT
- APT Programmer enables in-factory and in-field changes to control settings including CCT range, CCT mapping and Intensity mapping

Ordering Information

Product Code	Description
APT-CV2-V*x*-LN-*wwww*	**V*x*** – Hardware version **LN** – Linear form factor ***wwww*** – Internal code provided by Arkalumen as a simplified configuration code for repeat orders

Hardware Version	Functionality
VD	0-10V (Non-isolated)

System Architecture

Design Requirements	
1.	Ensure DC V_{IN} is greater than V_{OUT} of each channel (dictated by the LED forward voltage of the channel).
2.	If optimized transition is desired, use transition calibration feature in the advanced tab of the APT Programmer
3.	Minimize ΔV of each channel for optimal efficiency. ΔV_{MAX} is determined based on the channel current (I_{CH}). For I_{CH} < 1.0A, ΔV_{MAX} = 15V For 1.0A < I_{CH} < 2.0A, ΔV_{MAX} = 10V For 2.0A < I_{CH} < 2.5A, ΔV_{MAX} = 6.0V For 2.5A < I_{CH} < 3.2A, ΔV_{MAX} = 3.5V
4.	LED channels should be able to handle a minimum of 80mA ripple. 80mA ripple is seen with the following conditions, 1.2A/channel and 1.2V ΔV. Current ripple is dependent on ΔV of each channel.
5.	APT controllers are designed to work with a wide range of drivers, but a fixture manufacturer must test the APT controller for driver compatibility and ensure proper system operation before installation.

Contact Arkalumen for technical support at **support@arkalumen.com**

Mechanical Specifications

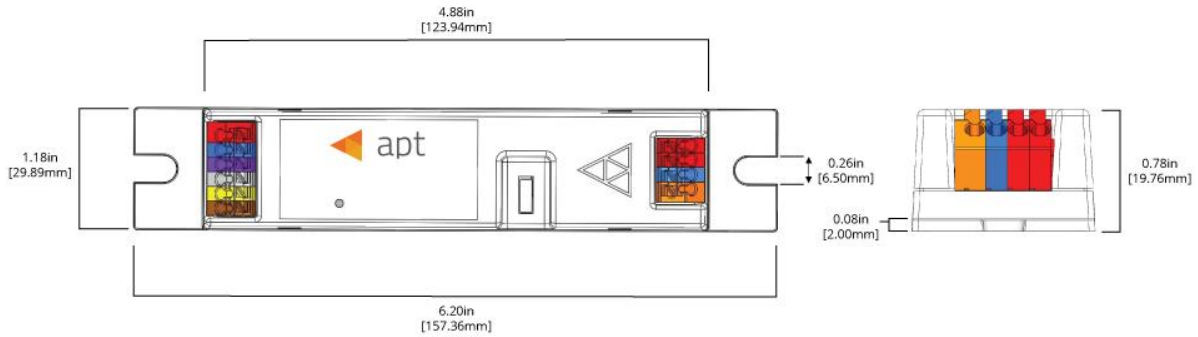


Figure 1 - APT-CV2-Vx-LN Mechanical Drawing

Dimensions	Inches
Length	6.20
Width	1.18
Height	0.78

APT-CV2-VD-LN Module (0-10V Non-isolated)

Electrical Specifications

Input

Port	Voltage			Current			Power		
	Min	Max		Min	Max		Min	Max	
DC IN +/-	12	60	V	10	4,100	mA	-	100	W
0-10V IN1/IN2 (Sink)	0	12	V	0	90	µA	-	-	
0-10V IN1/IN2 (Source)	0	12	V	0	700	µA	-	-	

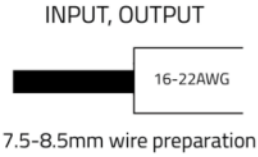
Output

Port	Voltage			Current			Power		
	Min	Max		Min	Max		Min	Max	
+	-	58	V	0	4,090	mA	-	100	W
CH1	-	58	V	0	3,200	mA	-	-	
CH2	-	58	V	0	3,200	mA	-	-	

Wiring Diagram

Figure 2 - APT-CV2-VD-LN Dual 0-10V Dimmer Configuration

Wiring	AWG
Input, Output	**16-22**



Ordering Information

Product Code	Description
APT-CV2-VD-LN-*wwww*	**VD** – Non-isolated 0-10V hardware version **LN** – Linear form factor ***wwww*** – Internal code provided by Arkalumen as a simplified configuration code for repeat orders

Configuration Code	Description
nnnn*-0000-*tttt*-1C*xxx*-2C*xxx	***nnnn*** – IN1/IN2 port control features **0000** – No base address to be specified ***tttt*** – Output control feature ***y*C*xxx*** – Channel-specific max current

Code	Description	Option	Configuration Trait
nnnn	***nnnn*** denotes the control features assigned to each IN port.	**IN00**	Intensity control enabled on IN2 port.
		CICI	Independent channel control enabled.
		INCT	Intensity control enabled on IN2 port and CCT control enabled on IN1 port.
tttt	***tttt*** denotes the output control features enabled on the controller.	**0000**	Calibrated CCT mapping disabled.
		CALC	Calibrated CCT enabled. Calibrated CCT can be customized to output specific desired light metrics.
y*C*xxx	***y*C*xxx*** denotes the maximum current for channel ***y*** as configured in the controller's firmware in 20mA increments.	**1C###**	Maximum current specified up to 3,200mA. e.g. -1C200-2C200 would specify 2000mA max current for channel 1 and 2.
		2C###	

Operating Conditions

Temperature Limits	
Max Temperature, Tc*	85°C
Min Ambient Temperature, Ta	-40°C

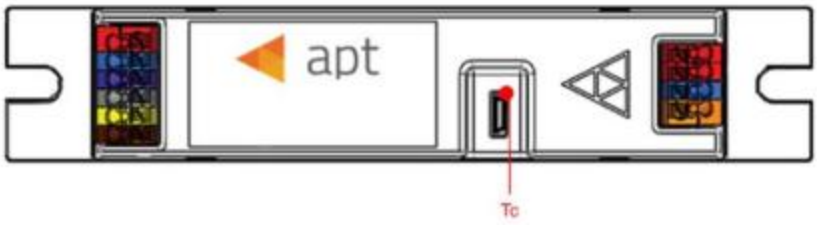


Figure 3– Tc is measured on metal sleeve of micro-USB programming port in location specified above

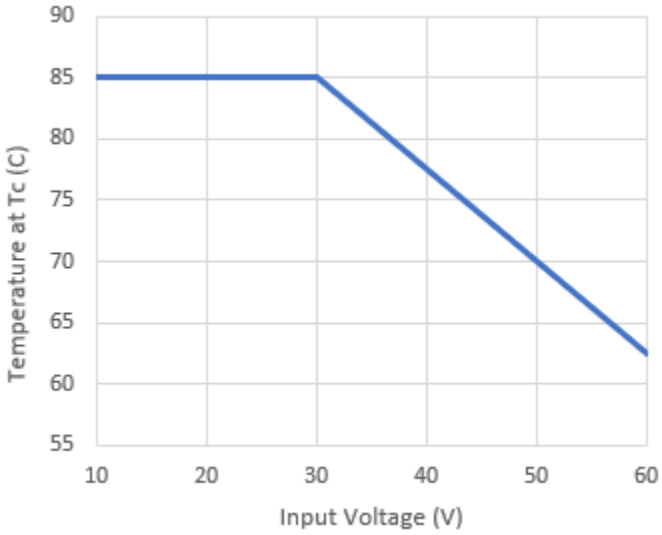


Figure 4 - APT-CV2-VD-LN Temperature Derating

ENCLOSURE DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

SAGINAW CONTROL & ENGINEERING
Your Enclosure Source ®

SCREW COVER ENCLOSURES

Application
Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. Provides protection from dust, dirt, oil and water. For installation information, consult our installation manual at www.saginawcontrol.com.

Construction
- 0.063" carbon steel.
- Seams continuously welded and ground smooth, no holes or knockouts.
- Captivated cover screws thread into sealed wells.
- Pour in place oil and water resistant gasket.
- Standoffs provided for mounting optional sub-panels.

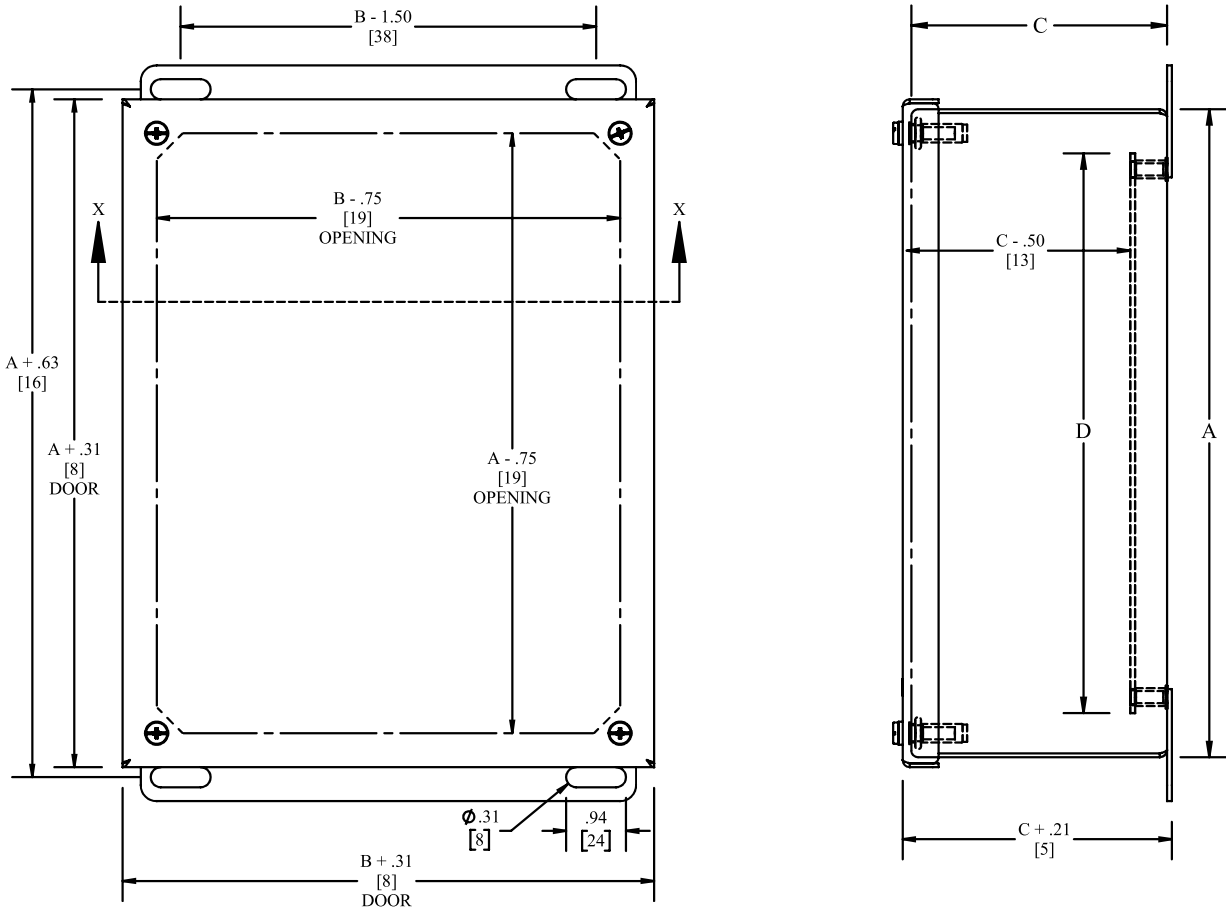
Finish
ANSI-61 gray powder coated inside and out.
Optional sub-panels powder coated white.

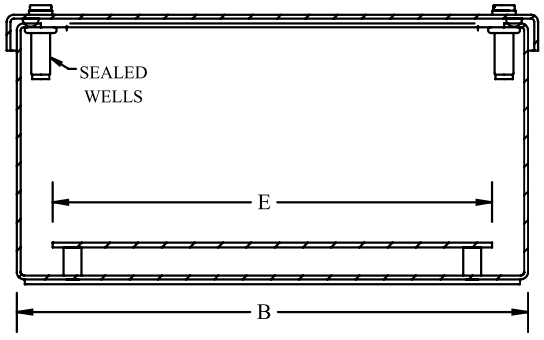
IS4 Industry Standards
NEMA Type 3R, 4, 12 & Type 13
UL Listed Type 3R, 4 & 12
CSA Type 3R, 4 & 12
IEC 60529 IP66

***To maintain Type 3R listing, drainage is required. Install equally rated drainage device or drill a 1/8 to 1/4 inch hole in the bottom center of the enclosure, approximately 1 inch from the right, and 1 inch from the left for drainage, use listed rain-tight or wet location hubs. Drip shield over the door is recommended for all outdoor applications.

Enclosure Product Code A1					Sub-Panel (P3)		
Catalog No.	Height (A)	Width (B)	Depth (C)	Industry Standard	Catalog No.	Panel Height (D)	Panel Width (E)
SCE-404SC	4.13	4.00	3.00	IS4	No Panel		
SCE-4044SC	4.13	4.00	4.00	IS4	No Panel		
SCE-604SC	6.13	4.00	3.00	IS4	SCE-6P4	5.00	3.00
SCE-6044SC	6.13	4.00	4.00	IS4	SCE-6P4	5.00	3.00
SCE-606SC	6.13	6.00	4.00	IS4	SCE-6P6	5.00	5.00
SCE-806SC	8.13	6.00	3.50	IS4	SCE-8P6	7.00	5.00
SCE-8066SC	8.13	6.00	6.00	IS4	SCE-8P6	7.00	5.00
SCE-808SC	8.13	8.00	4.00	IS4	SCE-8P8	7.00	7.00
SCE-1008SC	10.13	8.00	4.00	IS4	SCE-10P8	9.00	7.00
SCE-10086SC	10.13	8.00	6.00	IS4	SCE-10P8	9.00	7.00
SCE-1010SC	10.13	10.00	4.00	IS4	SCE-10P10	9.00	9.00
SCE-10106SC	10.13	10.00	6.00	IS4	SCE-10P10	9.00	9.00
SCE-1210SC	12.13	10.00	5.00	IS4	SCE-12P10	11.00	9.00
SCE-121010SC	12.13	10.00	10.00	IS4	SCE-12P10	11.00	9.00
SCE-1212SC	12.13	12.00	6.00	IS4	SCE-12P12	11.00	11.00
SCE-1412SC	14.13	12.00	6.00	IS4	SCE-14P12	13.00	11.00
SCE-1614SC	16.13	14.00	6.00	IS4	SCE-16P14	15.00	13.00

SCREW COVER ENCLOSURES
TECHNICAL DATA





SECTION X-X

NOTE:
SUB-PANEL SOLD SEPARATELY

SPRINKLER DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

Victaulic® FireLock Model FL-QR/C Standard Coverage, Quick Response Concealed Pendent Sprinklers, K5.6 (8.1)



1.0 PRODUCT DESCRIPTION

QUICK RESPONSE CONCEALED PENDENT SPRINKLERS			
SIN	**V5606**	**V3802[2]**	**V3808[2]**
ORIENTATION	Concealed Pendent	Concealed Pendent	Concealed Pendent
K-FACTOR[1]	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)	175 psi (1200 kPa)	300psi (2068 kPa)
ESCUTCHEON	Concealed	Concealed	Concealed
GLOBE RE-DESIGNATED	GL5606	–	–
GLOBE EQUIVALENT	-	GL5604	GL5605

AVAILABLE WRENCHES			
SPRINKLER	**1" ADJ Concealed**	**V38 Concealed**	**V38 Concealed**
PENDENT	■	■	■

CLEAN ROOM GASKET			
SPRINKLER	**1" ADJ Concealed**	**V38 Concealed**	**V38 Concealed**
PENDENT		■	■

Factory Hydrostatic Test: 100% @ 500 psi/3447 kPa/34 bar

Min. Operating Pressure: UL/FM: 7psi/48 kPa/.5 bar

Temperature Rating: See tables in section 2.0

1 For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

2 V3802 and V3808 are listed as Standard Response when installed using clean room gasketed coverplate.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

2.0 CERTIFICATION/LISTINGS

LPS 1186: Issue 3.1
Cert/LPCB Ref. 104b/06

APPROVALS/LISTINGS					
SIN	**V5606**	**Cover Plate**	**V3802**	**V3808**	**Cover Plate**
Nominal K Factor Imperial	5.6	–	5.6	5.6	–
Nominal K Factor S.I.[2]	8.1	–	8.1	8.1	–
Orientation	Pendent	–	Pendent	Pendent	–
Escutcheon	Concealed	–	Concealed	Concealed	–
	APPROVED TEMPERATURE RATINGS F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F /57°C | 155°F/68°C 155°F/68°C 155°F/68°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F/57°C 165°F/74°C 165°F/74°C
FM Standard Response Only	155°F/68°C 175°F/79°C 200°F/93°C	135°F /57°C | 155°F/68°C 155°F/68°C 155°F/68°C	155°F/68°C 175°F/79°C 200°F/93°C	–	135°F/57°C 135°F/57°C | 165°F/74°C 165°F/74°C
LPCB	–	–	155°F/68°C 175°F/79°C 200°F/93°C	–	138°F/59°C 165°F/74°C 165°F/74°C
CE	–	–	155°F/68°C 175°F/79°C 200°F/93°C	–	138°F/59°C 165°F/74°C 165°F/74°C
CCC K ZSTDY	–	–	155°F/68°C 200°F/93°C	–	135°F/57°C 135°F/57°C | 165°F/74°C

APPROVALS/LISTINGS WITH CLEAN ROOM GASKET			
SIN	**V3802[3]**	**V3808[3]**	**Cover Plate**
Nominal K Factor Imperial	5.6	5.6	–
Nominal K Factor S.I.[2]	8.1	8.1	–
Orientation	Pendent	Pendent	–
Escutcheon	Concealed	Concealed	–
	APPROVED TEMPERATURE RATINGS F°/C°		
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F/57°C 165°F/74°C 165°F/74°C

2 For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

3 Listed as standard response when installed clean room using gasketed coverplate.

NOTES

- Listings and approval as of printing.
- New York City Acceptance – All UL Listed and/or FM Appwroved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule.
- These sprinklers are required to be vented. Installations with a positive pressure air plenum above the housing are not permitted.

3.0 SPECIFICATIONS – MATERIAL

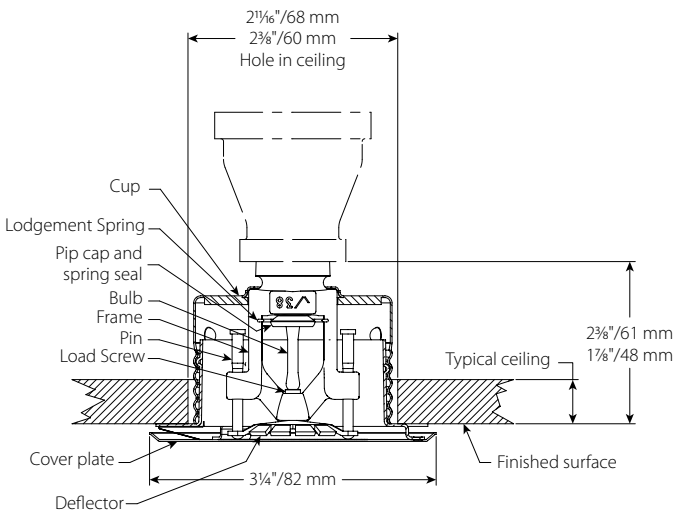
Deflector: Bronze
Bulb Nominal Diamter: 3.0 mm
Load Screw: Brass
Pip Cap: Brass
Spring Seal: PTFE coated Beryllium nickel alloy
Frame: Brass
Concealed Cup: Steel
Cover Plate: Steel
Lodgement Spring: Stainless Steel
Pin: Stainless Steel
Installation Wrench: Ductile Iron
Sealing Gasket: White nitrile (CLEAN ROOM USE ONLY)
Cover Plate Finishes:

- Chrome plated
- White painted
- Flat black painted
- Custom painted

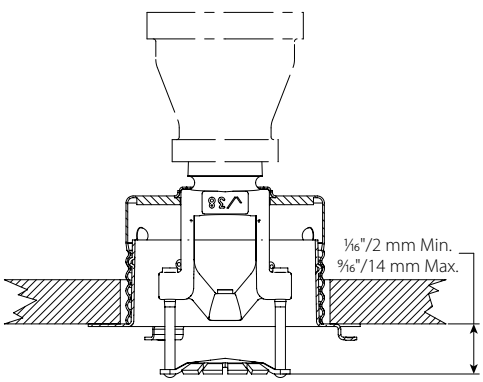
NOTE

- For cabinets and other accessories refer to separate sheet.

4.0 DIMENSIONS

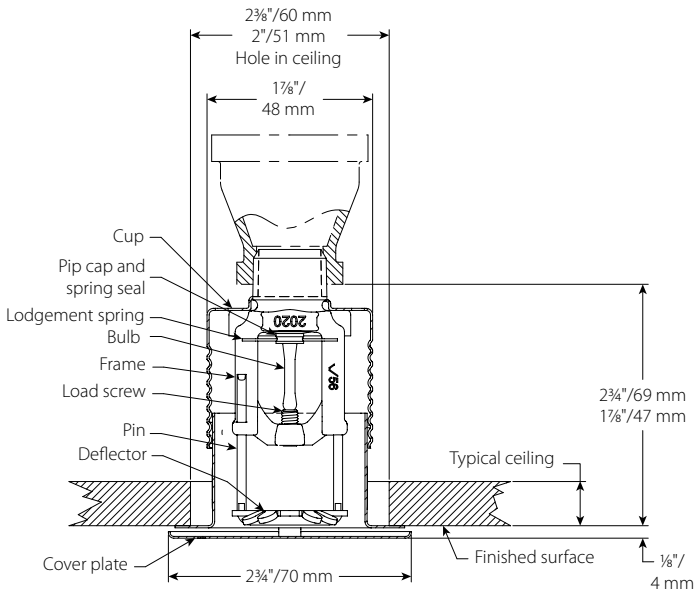


V3802, V3808

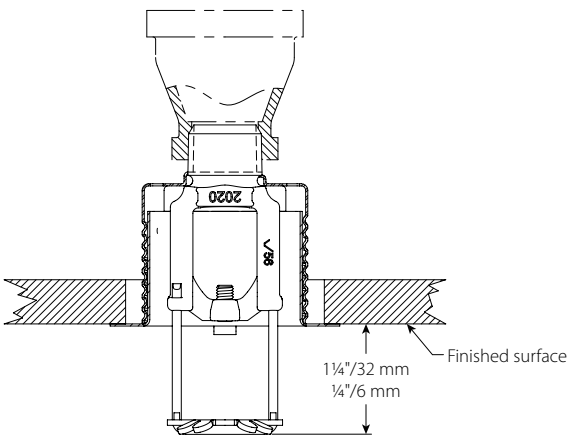


V3802, V3808

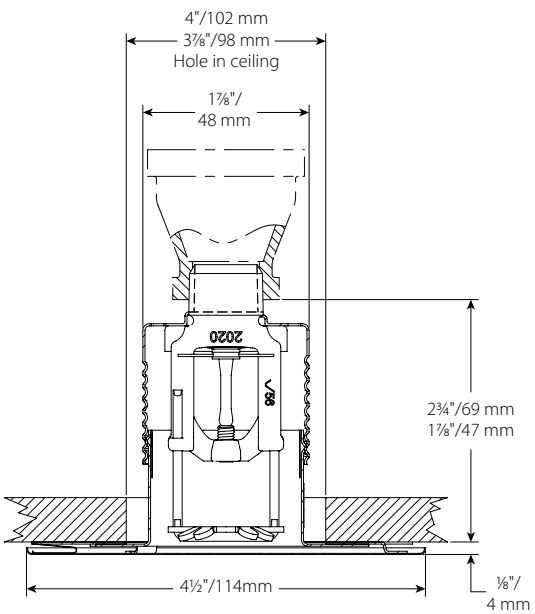
4.0 DIMENSIONS (CONTINUED)



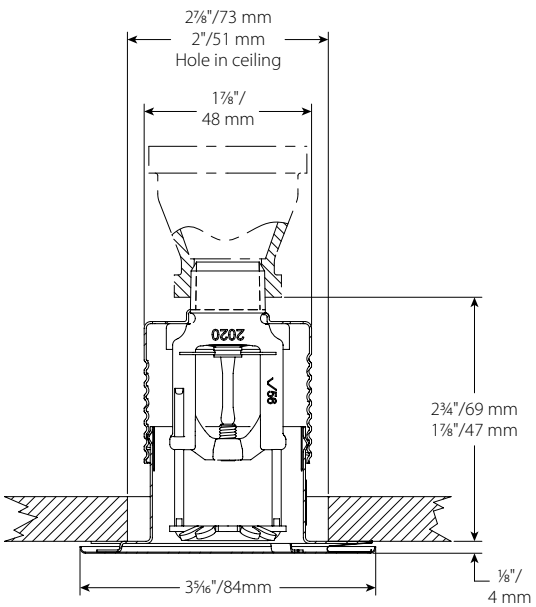
V5606



Activated Position
V5606



Seismic Coverplate
V5606



Large Coverplate
V5606

5.0 PERFORMANCE

Sprinkler is to be installed and designed as per NFPA, FM Datasheets, or any local standards.

6.0 NOTIFICATIONS

⚠ WARNING

- **Read and understand all instructions before attempting to install any Victaulic products.**
- **Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Wear safety glasses, hardhat, and foot protection.**

Failure to follow these instructions could result in death or serious personal injury and property damage.

- **These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13D, 13R, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.**
- **The installer shall understand the use of this product and why it was specified for the particular application.**
- **The installer shall understand common industry safety standards and potential consequences of improper product installation.**
- **It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.**
- **The material specifier shall evaluate the effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.**

Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

7.0 REFERENCE MATERIALS

Ratings: All glass bulbs are rated for temperatures from -67°F/-55°C.

41.53: Victaulic® FireLock™ Series FL-SR/C

1-40: Victaulic FireLock™ Automatic Sprinklers Installation and Maintenance Instructions

GEL SEAL DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

SAFETY DATA SHEET

Issuing Date 22-Apr-2019 **Revision date** 08-Jul-2020 **Revision Number** 3

1. Identification

Product identifier

Product Name Easy Pour Gel

Other means of identification

Product Code(s) ZG910804

Document ZG910804 or ZG910810

Synonyms zg910804-01, zg910804-05, zg910804-5box, zg910804-55, ZG910810-CN

Recommended use of the chemical and restrictions on use

Recommended use Industrial use

Restrictions on use No information available

Details of the supplier of the safety data sheet

Manufacturer Address
W. M. Plastics, Inc 5301 Terminal Street, Suite A, Charlotte, NC 28208 USA

Emergency telephone number

Company Phone Number Non-emergency 1-704-599-0511
24 Hour Emergency Phone Number Infotrac 1-800-535-0853 24 Hour (US & Canada)
Emergency Telephone Infotrac 800 535-0853 24 Hour (US & Canada)

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Respiratory sensitization	Category 1***
Skin sensitization	Category 1***

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Danger***

Hazard statements
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction***

Appearance Liquid **Physical state** Liquid **Odor** Slight

Precautionary Statements - Prevention
In case of inadequate ventilation wear respiratory protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing must not be allowed out of the workplace
Wear protective gloves***

Precautionary Statements - Response
Specific treatment (see .? on this label)***
IF ON SKIN: Wash with plenty of water and soap
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse***
IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor***

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant***

Other information
Very toxic to aquatic life with long lasting effects
Very toxic to aquatic life***

Unknown acute toxicity 13.7 % of the mixture consists of ingredient(s) of unknown toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute oral toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)***

3. Composition/information on ingredients

Substance

Not applicable.***

Mixture ***

Synonyms zg910804-01, zg910804-05, zg910804-5box, zg910804-55, ZG910810-CN.

Chemical name	CAS No.	Weight-%	Trade secret
DIDP	68515-49-1	80 - 100	*
Additive 30	41556-26-7	0.1 - 1	*
ISO 03	5124-30-1	0.1 - 1	*

The product contains no substances which at their given concentration, are considered to be hazardous to health.

4. First-aid measures

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance.***

Inhalation May cause allergic respiratory reaction. If breathing has stopped, give artificial respiration. Get medical attention immediately. Remove to fresh air. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Get immediate medical advice/attention.***

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash with soap and water. May cause an allergic skin reaction. In the case of skin irritation or allergic reactions see a physician.***

Ingestion May produce an allergic reaction. Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Get immediate medical advice/attention.***

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. See section 8 for more information.***

Most important symptoms and effects, both acute and delayed

Symptoms May cause allergy or asthma symptoms or breathing difficulties if inhaled. Coughing and/ or wheezing. Itching. Rashes. Hives.***

Indication of any immediate medical attention and special treatment needed

Note to physicians May cause sensitization in susceptible persons. Treat symptomatically.***

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical May cause sensitization by inhalation and skin contact. Product is or contains a sensitizer. May cause sensitization by skin contact.***

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge None.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.***

Other information Refer to protective measures listed in Sections 7 and 8.***

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

7. Handling and storage

Precautions for safe handling

Advice on safe handling Provide extract ventilation to points where emissions occur. Remove contaminated clothing and shoes. Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.***

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Store locked up. Keep out of the reach of children.***

8. Exposure controls/personal protection

Control parameters

Exposure Limits The following ingredients are the only ingredients of the product above the cut-off level (or level that contributes to the hazard classification of the mixture) which have an exposure limit applicable in the region for which this safety data sheet is intended or other recommended limit. At this time, the other relevant constituents have no known exposure limits from the sources listed here.***

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
ISO 03 5124-30-1	TWA: 0.005 ppm	(vacated) S* (vacated) Ceiling: 0.01 ppm (vacated) Ceiling: 0.11 mg/m^3	Ceiling: 0.01 ppm Ceiling: 0.11 mg/m^3

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).***

Hand protection Wear suitable gloves.***

Skin and body protection Wear suitable protective clothing.***

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use.***

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Liquid
Color	amber
Odor	Slight
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	No data available	None known
Melting point / freezing point	No data available	None known
Boiling point / boiling range	> 200	None known
Flash point	> 200 °C / °F	
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Relative density	.96	***
Water solubility	No data available	None known
Solubility in other solvents	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known

Other information

Explosive properties	No information available
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
VOC Content (%)	<0.02 g/L .?***
Liquid Density	.96
Bulk density	No information available

10. Stability and reactivity

Reactivity No information available.

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions None under normal processing.

Conditions to avoid None known based on information supplied.

Incompatible materials None known based on information supplied.

Hazardous decomposition products None known based on information supplied.

11. Toxicological information

Information on likely routes of exposure

Product Information ***

Inhalation Specific test data for the substance or mixture is not available. May cause sensitization in susceptible persons. (based on components).***

Eye contact Specific test data for the substance or mixture is not available.

Skin contact May cause sensitization by skin contact. Specific test data for the substance or mixture is not available. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. (based on components).***

Ingestion Specific test data for the substance or mixture is not available. May cause additional affects as listed under "Inhalation".***

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing. Coughing and/ or wheezing. Itching. Rashes. Hives.***

Acute toxicity

Numerical measures of toxicity
***

The following values are calculated based on chapter 3.1 of the GHS document .***
ATEmix (oral) 62,297.80*** mg/kg***
ATEmix (dermal) 16,596.20*** mg/kg***

Unknown acute toxicity 13.7 % of the mixture consists of ingredient(s) of unknown toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute oral toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)***
13.7 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)***

Component Information ***

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
DIDP 68515-49-1	> 60000 mg/kg (Rat)	= 16000 mg/kg (Rabbit)	-
Additive 30 41556-26-7	= 2615 mg/kg (Rat)	-	-
ISO 03 5124-30-1	= 9900 mg/kg (Rat)	> 10000 mg/kg (Rabbit)	= 434 mg/m^3 (Rat) 4 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation No information available.

Serious eye damage/eye irritation No information available.

Respiratory or skin sensitization May cause sensitization by inhalation. May cause sensitization by skin contact.***

Germ cell mutagenicity No information available.

Carcinogenicity No information available.

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration hazard No information available.

Other adverse effects No information available.

Interactive effects No information available.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.***

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
DIDP 68515-49-1	EC50: >1.3mg/L (96h, Pseudokirchneriella subcapitata)	LC50: >0.66mg/L (96h, Pimephales promelas) LC50: >1mg/L (96h, Pimephales promelas) LC50: >1mg/L (96h, Oncorhynchus mykiss) LC50: >0.62mg/L (96h, Oncorhynchus mykiss) LC50: >0.55mg/L (96h, Lepomis macrochirus)	-	EC50: >0.18mg/L (48h, Daphnia magna)
Additive 30 41556-26-7	-	LC50: =0.97mg/L (96h, Lepomis macrochirus)	-	EC50: =20mg/L (24h, Daphnia magna)
ISO 03 5124-30-1	-	LC50: =1.2mg/L (96h, Brachydanio rerio) LC50: 1.2 - 2.76mg/L (96h, Brachydanio rerio)	-	-

Persistence and degradability No information available.

Bioaccumulation There is no data for this product.

Component Information ***

Chemical name	Partition coefficient
Additive 30 41556-26-7	0.37

Other adverse effects No information available.

13. Disposal considerations

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

14. Transport information

DOT	Item 46030 Liquid Plastics NOI Not Regulated Class 55
TDG	Not regulated
MEX	Not regulated
ICAO (air)	Not regulated
IATA	Not regulated
IMDG	Not regulated
RID	Not regulated
ADR	Not regulated
ADN	Not regulated

15. Regulatory information

International Inventories

TSCA	Contact supplier for inventory compliance status.
DSL/NDSL	Contact supplier for inventory compliance status.
EINECS/ELINCS	Contact supplier for inventory compliance status.
ENCS	Contact supplier for inventory compliance status.
IECSC	Contact supplier for inventory compliance status.
KECL	Contact supplier for inventory compliance status.
PICCS	Contact supplier for inventory compliance status.
AICS	Contact supplier for inventory compliance status.

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications. Under the amended regulations at 40 CFR 370, EPCRA 311/312 Tier II reporting for the 2017 calendar year will need to be consistent with updated hazard classifications.

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).***

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
DIDP 68515-49-1	-	X	-	-

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:.***

Chemical name	California Proposition 65
DIDP	Developmental

U.S. State Right-to-Know Regulations

US State Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
DIDP 68515-49-1	-	-	X
ISO 02 9016-87-9	X	-	-

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

NFPA	**Health hazards**	2***	**Flammability**	1	**Instability**	0	**Physical and chemical properties** -
HMIS	**Health hazards**	2 ****	**Flammability**	1	**Physical hazards**	0	**Personal protection** X

Chronic Hazard Star Legend * = Chronic Health Hazard***

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))

U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
RTECS (Registry of Toxic Effects of Chemical Substances)
World Health Organization

Issuing Date 22-Apr-2019

Revision date 08-Jul-2020

Revision Note No information available.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Data for Regulatory Rules

Region	Template name	Revision Note
United States of America	AGHS	2.0

Acute health hazard Yes***
Chronic Health Hazard Yes***
TSCA Does not comply
DSL/NDSL Does not comply
EINECS/ELINCS Does not comply
ENCS Does not comply
IECSC Does not comply
KECL Does not comply
PICCS Does not comply
AICS Does not comply

GHS Product Information

Physical state Liquid

Americas (OSHA)

GHS Classification

Signal word Danger***

Respiratory sensitization	Category 1***
Hazard statements	May cause allergy or asthma symptoms or breathing difficulties if inhaled***
Signal word	Danger***
Skin sensitization	Category 1***
Hazard statements	May cause an allergic skin reaction***
Signal word	Warning***
Respiratory sensitization	- (H334)***
Skin sensitization	- (H317)***
Graphic	
Graphic	
Hazard statements	May cause allergy or asthma symptoms or breathing difficulties if inhaled May cause an allergic skin reaction***
Hazard statements	H317 - May cause an allergic skin reaction H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled***
Precautionary Statements - EU (§28, 1272/2008)	P261 - Avoid breathing dust/fume/gas/mist/vapors/spray P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician P304 + P341 - IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing P308 + P313 - IF exposed or concerned: Get medical advice/attention P280 - Wear eye protection/ face protection P321 - Specific treatment (see .? on this label)***
Skin	IF ON SKIN: Wash with plenty of water and soap If skin irritation or rash occurs: Get medical advice/attention Wash contaminated clothing before reuse***

Precautionary Statements - Prevention

In case of inadequate ventilation wear respiratory protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing must not be allowed out of the workplace
Wear protective gloves***

Precautionary Statements - Response

Specific treatment (see .? on this label)***

Skin

IF ON SKIN: Wash with plenty of water and soap
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse***

Inhalation

IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor***

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant***

The following values are calculated based on chapter 3.1 of the GHS document	***
ATEmix (oral) mg/kg***	62,297.80***
ATEmix (dermal) mg/kg***	16,596.20***

Contains ISO 03

Unknown aquatic toxicity	0 % of the mixture consists of component(s) of unknown hazards to the aquatic environment***
Unknown Acute Aquatic Toxicity	15.3***
Unknown Chronic Aquatic Toxicity	0***
Product ATE Oral Status	1***
Product ATE Dermal Status	1***
Product ATE Inhalation - Gas Status	1***

Label elements

(Bad file name)

WARNING!*** This product can expose you to chemicals including those listed below, which is [are] known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.***

Chemical name	California Proposition 65
DIDP - 68515-49-1	Developmental

CAULKING DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: DOWSIL™ 732 Multi-Purpose Sealant, Aluminium

Issue Date: 04/27/2020

Print Date: 04/30/2020

THE DOW CHEMICAL COMPANY encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: DOWSIL™ 732 Multi-Purpose Sealant, Aluminium

Recommended use of the chemical and restrictions on use
Identified uses: Adhesive, binding agents

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2211 H.H. DOW WAY
MIDLAND MI 48674
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

Label elements

Precautionary statements
Prevention
Use only outdoors or in a well-ventilated area.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Silicone elastomer
This product is a mixture.
Contains no hazardous ingredients according to GHS

4. FIRST AID MEASURES

Description of first aid measures
General advice:
If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air and keep comfortable for breathing; consult a physician.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Water spray. Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media: None known..

Special hazards arising from the substance or mixture

Hazardous combustion products: Carbon oxides. Silicon oxides.

Unusual Fire and Explosion Hazards: Exposure to combustion products may be a hazard to health..

Advice for firefighters

Fire Fighting Procedures: Use water spray to cool unopened containers.. Evacuate area.. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations..

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Remove undamaged containers from fire area if it is safe to do so.

Special protective equipment for firefighters: Wear self-contained breathing apparatus for firefighting if necessary.. Use personal protective equipment..

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Wipe up or scrape up and contain for salvage or disposal. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling: Take care to prevent spills, waste and minimize release to the environment. Handle in accordance with good industrial hygiene and safety practice.
Use only with adequate ventilation. See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Conditions for safe storage: Keep in properly labelled containers. Store in accordance with the particular national regulations.

Do not store with the following product types: Strong oxidizing agents.
Unsuitable materials for containers**:** None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Although some of the components of this product may have exposure guidelines, no exposure would be expected under normal handling conditions due to the physical state of the material.

Exposure controls
Engineering controls: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use safety glasses (with side shields).

Skin protection

Hand protection: Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.

Other protection: No precautions other than clean body-covering clothing should be needed.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

The following should be effective types of air-purifying respirators: Organic vapor cartridge.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	paste
Color	grey
Odor	acetic acid
Odor Threshold	No data available
pH	Not applicable
Melting point/range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	Not applicable
Flash point	Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammability (solid, gas)	Not classified as a flammability hazard
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	Not applicable
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	1.04
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Dynamic Viscosity	Not applicable
Kinematic Viscosity	Not applicable
Explosive properties	Not explosive

Oxidizing properties	The substance or mixture is not classified as oxidizing.
Liquid Density	1.04 g/cm3
Molecular weight	No data available
Particle size	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents.

Conditions to avoid: None known.

Incompatible materials: Oxidizing agents

Hazardous decomposition products:
Decomposition products can include and are not limited to: Formaldehyde.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Information on likely routes of exposure
Eye contact, Skin contact, Ingestion.

Acute toxicity (represents short term exposures with immediate effects - no chronic/delayed effects known unless otherwise noted)

Acute oral toxicity
Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product: Single dose oral LD50 has not been determined.

Based on information for component(s):
LD50, Rat, > 5,000 mg/kg Estimated.

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

Based on information for component(s):
LD50, Rabbit, > 2,000 mg/kg Estimated.

Acute inhalation toxicity

Brief exposure (minutes) is not likely to cause adverse effects. Vapor from heated material may cause respiratory irritation.

As product: The LC50 has not been determined.

Skin corrosion/irritation
Based on information for component(s):
Prolonged exposure not likely to cause significant skin irritation.

Serious eye damage/eye irritation
Based on information for component(s):
May cause slight temporary eye irritation.
May cause mild eye discomfort.

Sensitization
For skin sensitization:
Contains component(s) which did not cause allergic skin sensitization in guinea pigs.

For respiratory sensitization:
No relevant information found.

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Chronic toxicity (represents longer term exposures with repeated dose resulting in chronic/delayed effects - no immediate effects known unless otherwise noted)

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on information for component(s):
Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Contains an additional component(s) that is not expected to be bioavailable due to the physical state of the material under normal handling and processing conditions.

Carcinogenicity
For this family of materials: Did not cause cancer in long-term animal studies which used routes of exposure considered relevant to industrial handling. Positive results have been reported in other studies using routes of exposure not relevant to industrial handling.

Teratogenicity
For similar material(s): Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive toxicity
For similar material(s): In animal studies, did not interfere with reproduction.

Mutagenicity
Contains a component(s) which were negative in in vitro genetic toxicity studies.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity
No data available.

Persistence and degradability
No data available.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. For additional information, refer to: Handling & Storage Information, MSDS Section 7 Stability & Reactivity Information, MSDS Section10 Regulatory Information, MSDS Section 15

Treatment and disposal methods of used packaging: Empty containers should be recycled or otherwise disposed of by an approved waste management facility. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. Do not re-use containers for any purpose.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
No SARA Hazards

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Pennsylvania Right To Know
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	**CASRN**
Polydimethylsiloxane hydroxy-terminated	70131-67-8
Silicon dioxide	7631-86-9
Aluminium	7429-90-5

California Prop. 65
This product contains a chemical that is at or below California Propositions 65's "safe harbor level" as determined via a risk assessment. Therefore, the chemical is not required to be listed as a Prop 65 chemical on the SDS or label.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System
NFPA

Health	Flammability	Instability
0	1	0

HMIS

Health	Flammability	Physical Hazard
0/	1	0

Revision
Identification Number: 1891987 / A001 / Issue Date: 04/27/2020 / Version: 6.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here

pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
US

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: DOWSIL™ 732 Adhesive Sealant, White **Issue Date:** 04/27/2020
Print Date: 02/17/2021

THE DOW CHEMICAL COMPANY encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: DOWSIL™ 732 Adhesive Sealant, White

Recommended use of the chemical and restrictions on use
Identified uses: Adhesive, binding agents

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2211 H.H. DOW WAY
MIDLAND MI 48674
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

Label elements

Precautionary statements
Prevention
Use only outdoors or in a well-ventilated area.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Silicone elastomer

This product is a mixture.
Contains no hazardous ingredients according to GHS

4. FIRST AID MEASURES

Description of first aid measures
General advice:
If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air and keep comfortable for breathing; consult a physician.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: Rinse mouth with water. No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Skin contact may aggravate preexisting dermatitis.

5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Water spray. Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media: None known..

Special hazards arising from the substance or mixture

Hazardous combustion products: Carbon oxides. Silicon oxides.

Unusual Fire and Explosion Hazards: Exposure to combustion products may be a hazard to health..

Advice for firefighters

Fire Fighting Procedures: Use water spray to cool unopened containers.. Evacuate area.. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations..
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Remove undamaged containers from fire area if it is safe to do so.

Special protective equipment for firefighters: Wear self-contained breathing apparatus for firefighting if necessary.. Use personal protective equipment..

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Wipe up or scrape up and contain for salvage or disposal. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling: Take care to prevent spills, waste and minimize release to the environment. Handle in accordance with good industrial hygiene and safety practice. CONTAINERS MAY BE HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue follow all (M)SDS and label warnings even after container is emptied.
Use only with adequate ventilation. See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Conditions for safe storage: Keep in properly labelled containers. Store in accordance with the particular national regulations.

Do not store with the following product types: Strong oxidizing agents.
Unsuitable materials for containers**:** None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Exposure controls
Engineering controls: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures
Eye/face protection: Use safety glasses (with side shields).

Skin protection

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Examples of acceptable glove barrier materials include: Natural rubber ("latex"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Wear clean, body-covering clothing.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

The following should be effective types of air-purifying respirators: Organic vapor cartridge.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	paste
Color	white
Odor	acetic acid
Odor Threshold	No data available
pH	Not applicable
Melting point/range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	Not applicable
Flash point	Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammability (solid, gas)	Not classified as a flammability hazard
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	Not applicable
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	1.04
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available

Dynamic Viscosity	Not applicable
Kinematic Viscosity	Not applicable
Explosive properties	Not explosive
Oxidizing properties	The substance or mixture is not classified as oxidizing.
Liquid Density	1.04 g/cm3
Molecular weight	No data available
Particle size	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents.

Conditions to avoid: None known.

Incompatible materials: Oxidizing agents

Hazardous decomposition products:
Decomposition products can include and are not limited to: Formaldehyde.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Information on likely routes of exposure
Eye contact, Skin contact, Ingestion.

Acute toxicity (represents short term exposures with immediate effects - no chronic/delayed effects known unless otherwise noted)

Acute oral toxicity
Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product: Single dose oral LD50 has not been determined.

Based on information for component(s):
LD50, Rat, > 5,000 mg/kg Estimated.

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

Based on information for component(s):

LD50, > 2,000 mg/kg Estimated.

Acute inhalation toxicity
Brief exposure (minutes) is not likely to cause adverse effects. Vapor from heated material may cause respiratory irritation.

As product: The LC50 has not been determined.

Skin corrosion/irritation
Based on information for component(s):
Prolonged contact is essentially nonirritating to skin.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation
Based on information for component(s):
May cause slight temporary eye irritation.
Corneal injury is unlikely.
May cause mild eye discomfort.

Sensitization
For skin sensitization:
Contains component(s) which did not cause allergic skin sensitization in guinea pigs.

For respiratory sensitization:
No relevant information found.

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Chronic toxicity (represents longer term exposures with repeated dose resulting in chronic/delayed effects - no immediate effects known unless otherwise noted)

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data for the component(s), repeated exposures are not anticipated to cause significant adverse effects.

Carcinogenicity
No relevant data found.

Teratogenicity
Contains component(s) which did not cause birth defects or any other fetal effects in lab animals.

Reproductive toxicity
Contains component(s) which did not interfere with reproduction in animal studies.

Mutagenicity
In vitro genetic toxicity studies were negative for component(s) tested. Genetic toxicity studies in animals were negative for component(s) tested.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity
No data available.

Persistence and degradability
No data available.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. For additional information, refer to: Handling & Storage Information, MSDS Section 7 Stability & Reactivity Information, MSDS Section10 Regulatory Information, MSDS Section 15

Treatment and disposal methods of used packaging: Empty containers should be recycled or otherwise disposed of by an approved waste management facility. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. Do not re-use containers for any purpose.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
No SARA Hazards

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Pennsylvania Right To Know
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	**CASRN**
Polydimethylsiloxane hydroxy-terminated	70131-67-8
Silicon dioxide	7631-86-9

California Prop. 65
This product contains a chemical that is at or below California Propositions 65's "safe harbor level" as determined via a risk assessment. Therefore, the chemical is not required to be listed as a Prop 65 chemical on the SDS or label.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System
NFPA

Health	Flammability	Instability
0	1	0

HMIS

Health	Flammability	Physical Hazard

0/	1	0

Revision
Identification Number: 6020811 / A001 / Issue Date: 04/27/2020 / Version: 6.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the

safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
US

Technical Data Sheet

DOWSIL™ 732 Multi-Purpose Sealant

General purpose silicone adhesive/sealant (specified)

Features & Benefits

- One-part adhesive/sealant
- Cures at room temperature when exposed to moisture in the air
- Acetoxy cure system
- Non-sag, paste consistency
- Easy to apply
- Cures to a tough, flexible rubber
- Good adhesion to many substrates
- Stable and flexible from -60°C to +180°C (-76°F to +356°F), with short peaks up to +205°C (401°F)
- Black version: stable and flexible from -60°C to +205°C (-76°F to +401°F), with short peaks up to +230°C (446°F)
- Excellent dielectric properties
- Complies with MIL-A-46106
- Complies with FDA 177.2600
- Available in white, black, clear and aluminum

Applications

- General industrial sealing and bonding applications
- Complies with MIL-A-46106 and FDA 177.2600

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

CTM[1]	ASTM[2]	Property	Unit	Result
		As Supplied		
0176		Appearance		Non-slump paste
		Color(s)		White, black, clear o aluminum
0364		Extrusion rate[3]	g/minute	350
0098		Skin-over time	minutes	7
0095		Tack-free time	minutes	20

1. CTM: Corporate Test Method, copies of CTMs are available on request.
2. ASTM: American Society for Testing and Materials.
3. Extrusion rate: 3.2 mm orifice at 0.62 MPa.

Typical Properties

CTM	ASTM	Property	Unit	Result
		Mechanical properties, cured 7 days in air at 25°C (77°F) and 50% relative humidity		
0097B	D1475	Specific gravity		1.04
0099	D2240	Durometer hardness, Shore A		25
0137A	D412	Tensile strength	MPa	2.3
0137A	D412	Elongation at break	%	540
0420		Volume coefficient of thermal expansion	1/K	$1.12x10^{-3}$
		Electrical properties, cured 7 days in air at 25°C (77°F) and 50% relative humidity		
0114	D149	Dielectric strength	kV/mm	21.6
0112	D150	Dielectric constant at 100 Hz/100 kHz		2.8
0112	D150	Dissipation factor at 100 Hz/100 kHz		0.0015
0112	D150	Volume resistivity	Ohm.cm	$1.5x10^{15}$

How to Use

Substrate Preparation

All surfaces must be clean and dry. Degrease and wash off any contaminants that could impair adhesion. Suitable solvents include isopropyl alcohol, acetone or methyl ethyl ketone.

Unprimed adhesion may be obtained on many substrates such as glass, metals and most common engineering plastics. Substrates to which good adhesion is normally not obtained include PTFE, polyethylene, polypropylene and related materials.

However, for maximum adhesion, the use of DOWSIL™ 1200 OS Primer is recommended. After solvent cleaning, a thin coat of DOWSIL™ 1200 OS Primer is applied by dipping, brushing or spraying. Allow primer to dry for 15 to 90 minutes at room temperature and a relative humidity of 50% or higher.

How to Apply

Apply DOWSIL™ 732 Multi-Purpose Sealant to one of the prepared surfaces, then quickly cover with the other substrate to be bonded.

On exposure to moisture, the freshly applied material will "skin-over". Any tooling should be completed before this skin forms. The surface is easily tooled with a spatula. The adhesive/sealant will be tack-free in less than 45 minutes.

Cure Time

After skin formation, cure continues inward from the surface. In 24 hours (at room temperature and 50% relative humidity) DOWSIL™ 732 Multi-Purpose Sealant will cure to a depth of about 3 mm. Very deep sections, especially when access to atmospheric moisture is restricted will take longer to cure completely. Cure time is extended at lower humidity levels.

Before handling and packaging bonded components, users are advised to wait a sufficiently long time to ensure that the integrity of the adhesive seal is not affected. This will depend on many factors and should be determined by the user for each specific application.

Compatibility

DOWSIL™ 732 Multi-Purpose Sealant releases a small amount of acetic acid during cure. This may cause corrosion on some metallic parts or substrates, especially in direct contact or when the cure is carried out in a totally enclosed configuration which would not allow cure by-products to escape.

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

Product should be stored at or below 32°C (90°F) in original, unopened containers.

As DOWSIL™ 732 Multi-Purpose Sealant cures by reaction with moisture in air, keep the container tightly sealed when not in use. A plug of used material may form in the tip of a tube or cartridge during storage. This is easily removed and does not affect the remaining contents.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

dow.com

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

POWDERCOAT DATA

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

PCFT80313

SILVERSAN™ Powder Coat

Highlights

PPG's Enviracryl™ and Envirocron™ powder coatings are aesthetically pleasing, produce a durable uniform finish and can be custom formulated with finishes from high gloss to low gloss, and in a variety of textures.

PPG's "World Class" Hybrid Powder Coatings provide a combination of good physical and chemical resistance properties. This extensive line of Hybrid Powders is manufactured to meet the increasing requirement demands of the appliance, automotive and industrial markets. These sophisticated Hybrids are the solution to your smoothness, low-bake, durability and physical property requirements. An unsurpassed application development program enables consistently friendly use on a variety of substrates.

Product Features

Available in a wide range of colors and glosses

Low cure capabilities

Good chemical resistance

Technical Properties

Property	Test Method	Value
Color	_____	White
Appearance		Smooth
Gloss	ASTM D-523	55 - 65 @ 60°
Adhesion	ASTM D-3359	100% (5B Pass)
Hardness	ASTM D-3363	2H Pencil (Eagle)
Impact Resistance	ASTM D-2794	100 In.-lbs. Direct
		80 In.-lbs. Reverse
Conical Mandrel	ASTM D-522	1/8" - No Cracking
Salt Spray	ASTM B-117	1000 Hrs. Pass
Humidity	ASTM D-1735	100F, 100% RH - 1000+ hours

Film Properties were determined using 2.0 - 3.0 mils powder film over 22 gauge (0.032") cold rolled steel B1000 test panels.

Application Data

Application Type:	Electrostatic Spray
Recommended Bake:	10 Minutes at 320 °F Metal Temperature See Cure Curve PCF-012
Specific Gravity:	1.57 ± .05
Theoretical Coverage:	123 Sq. Ft. per pound at 1.0 mil
Shelf Life from Date of Manufacture (@40-60% RH):	77 °F Maximum - 12 Months

PPG recommends that all material be used in FIFO order (first in - first out). Materials that exceed the recommended shelf life should be tested prior to use.

SAFETY DATA SHEET

Date of issue/Date of revision 4 February 2022
Version 6

Section 1. Identification

Product name : WHITE HYBRID
Product code : PCFT80313
Other means of identification : Not available.
Product type : Powder.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Industrial applications.
Use of the substance/ mixture : Coating. Paints. Painting-related materials.
Uses advised against : Not applicable.

Manufacturer : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
SETIQ Interior de la República: 800-00-214-00 (México)
SETIQ Ciudad de México: (55) 5559-1588 (México)
Technical Phone Number : 1-888-774-2001 (US and Canada)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture : COMBUSTIBLE DUSTS
RESPIRATORY SENSITIZATION - Category 1
CARCINOGENICITY - Category 1B
Percentage of the mixture consisting of ingredient(s) of unknown acute toxicity: 31.4% (oral), 31.4% (dermal), 65.4% (inhalation)

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause cancer.
May form combustible dust concentrations in air.

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves, protective clothing and eye or face protection. Wear respiratory protection. Avoid breathing dust or mist.

Response : IF exposed or concerned: Get medical advice or attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements : Keep container tightly closed. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Sanding and grinding dusts may be harmful if inhaled. Prevent dust accumulation. Emits toxic fumes when heated.

Hazards not otherwise classified : Fine dust clouds may form explosive mixtures with air. Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Product name : WHITE HYBRID

Ingredient name	%	CAS number
titanium dioxide	≥20 - ≤50	13463-67-7
polyester resin	≥20 - ≤50	Not available.
barium sulfate	≥1.0 - ≤5.0	7727-43-7
benzothiazole-2-thiol	<1.0	149-30-4
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	<1.0	552-30-7

SUB codes represent substances without registered CAS Numbers.

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Description of necessary first aid measures

Eye contact : Remove contact lenses, irrigate copiously with clean, fresh water, holding the eyelids apart for at least 10 minutes and seek immediate medical advice.

Section 4. First aid measures

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do NOT induce vomiting.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
irritation
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical powder.

Unsuitable extinguishing media : Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.

Specific hazards arising from the chemical : Fine dust clouds may form explosive mixtures with air.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon oxides
sulfur oxides
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 6. Accidental release measures

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Special precautions : If this material is part of a multiple component system, read the Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Do not store below the following temperature: 5°C (41°F). Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
titanium dioxide	**OSHA PEL (United States, 5/2018).** TWA: 15 mg/m³ 8 hours. Form: Total dust **ACGIH TLV (United States, 1/2021).** TWA: 10 mg/m³ 8 hours.
polyester resin	**ACGIH TLV (United States).** TWA: 3 mg/m³ Form: Respirable TWA: 10 mg/m³ TWA: 10 mg/m³ Form: Total dust

Section 8. Exposure controls/personal protection

barium sulfate	**OSHA PEL (United States).** TWA: 5 mg/m³ Form: Respirable TWA: 15 mg/m³ TWA: 15 mg/m³ Form: Total dust **ACGIH TLV (United States, 1/2021).** TWA: 5 mg/m³ 8 hours. Form: Inhalable fraction **OSHA PEL (United States, 5/2018).** TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust
benzothiazole-2-thiol	None.
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	**ACGIH TLV (United States, 1/2021).** **Absorbed through skin. Skin sensitizer. Inhalation sensitizer.** TWA: 0.0005 mg/m³ 8 hours. Form: Inhalable fraction and vapor STEL: 0.002 mg/m³ 15 minutes. Form: Inhalable fraction and vapor

Key to abbreviations

A	=	Acceptable Maximum Peak	S	=	Potential skin absorption
ACGIH	=	American Conference of Governmental Industrial Hygienists.	SR	=	Respiratory sensitization
C	=	Ceiling Limit	SS	=	Skin sensitization
F	=	Fume	STEL	=	Short term Exposure limit values
IPEL	=	Internal Permissible Exposure Limit	TD	=	Total dust
OSHA	=	Occupational Safety and Health Administration.	TLV	=	Threshold Limit Value
R	=	Respirable	TWA	=	Time Weighted Average
Z	=	OSHA 29 CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances			

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Section 8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety glasses with side shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Gloves : For prolonged or repeated handling, use the following type of gloves:

Recommended: butyl rubber, nitrile rubber, neoprene, natural rubber (latex)

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.
The respiratory protection shall be in accordance to 29 CFR 1910.134.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid.
Powder.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not applicable.

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: Not applicable.

Auto-ignition temperature : Not applicable.

Decomposition temperature : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not applicable.

Section 9. Physical and chemical properties

Evaporation rate : Not available.

Vapor pressure : Not available.

Vapor density : Not applicable.

Relative density : 1.61

Density (lbs / gal) : 13.44

Solubility : Insoluble in the following materials: cold water.

Partition coefficient: n-octanol/water : Not applicable.

Viscosity : Kinematic (40°C (104°F)): Not applicable.

Volatility : 0% (v/v), 0% (w/w)

% Solid. (w/w) : 100

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : When exposed to high temperatures may produce hazardous decomposition products. Refer to protective measures listed in sections 7 and 8.

Incompatible materials : Keep away from the following materials to prevent strong exothermic reactions: oxidizing agents, strong alkalis, strong acids.

Hazardous decomposition products : Depending on conditions, decomposition products may include the following materials: carbon oxides sulfur oxides metal oxide/oxides

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
titanium dioxide	LC50 Inhalation Dusts and mists	Rat	>6.82 mg/l	4 hours
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
barium sulfate	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
benzothiazole-2-thiol	LD50 Dermal	Rabbit	>7940 mg/kg	-
	LD50 Oral	Rat	100 mg/kg	-
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	LC50 Inhalation Dusts and mists	Rat	>2330 mg/m³	4 hours
	LD50 Oral	Rat	5.6 g/kg	-

Conclusion/Summary : There are no data available on the mixture itself.

Section 11. Toxicological information

Irritation/Corrosion

Conclusion/Summary

Skin : There are no data available on the mixture itself.

Eyes : There are no data available on the mixture itself.

Respiratory : There are no data available on the mixture itself.

Sensitization

Conclusion/Summary

Skin : There are no data available on the mixture itself.

Respiratory : There are no data available on the mixture itself.

Mutagenicity

Conclusion/Summary : There are no data available on the mixture itself.

Carcinogenicity

Conclusion/Summary : There are no data available on the mixture itself.

Classification

Product/ingredient name	OSHA	IARC	NTP
titanium dioxide	-	2B	-
benzothiazole-2-thiol	-	2A	-

Carcinogen Classification code:

IARC: 1, 2A, 2B, 3, 4
NTP: Known to be a human carcinogen; Reasonably anticipated to be a human carcinogen
OSHA: +
Not listed/not regulated: -

Reproductive toxicity

Conclusion/Summary : There are no data available on the mixture itself.

Teratogenicity

Conclusion/Summary : There are no data available on the mixture itself.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	Category 2	-	-

Target organs : Contains material which may cause damage to the following organs: kidneys, lungs, upper respiratory tract, immune system, eyes.

Aspiration hazard

Not available.

Information on the likely routes of exposure

Section 11. Toxicological information

Potential acute health effects

Eye contact : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
irritation
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Conclusion/Summary : There are no data available on the mixture itself. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Ingestion may cause nausea, diarrhea and vomiting. This takes into account, where known, delayed and immediate effects and also chronic effects of components from short-term and long-term exposure by oral, inhalation and dermal routes of exposure and eye contact.

Short term exposure

Potential immediate effects : There are no data available on the mixture itself.

Potential delayed effects : There are no data available on the mixture itself.

Long term exposure

Potential immediate effects : There are no data available on the mixture itself.

Potential delayed effects : There are no data available on the mixture itself.

Potential chronic health effects

General : Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Section 11. Toxicological information

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
WHITE HYBRID	N/A	43136.5	N/A	N/A	N/A
barium sulfate	N/A	2500	N/A	N/A	N/A
benzothiazole-2-thiol	100	N/A	N/A	N/A	N/A
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	5600	N/A	N/A	N/A	1.5

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
titanium dioxide	Acute LC50 >100 mg/l Fresh water	Daphnia - Daphnia magna	48 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
benzothiazole-2-thiol	2.42	7.94	low
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	0.06	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 13. Disposal considerations

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14. Transport information

	DOT	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class (es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Marine pollutant substances	Not applicable.	Not applicable.	Not applicable.

Additional information

DOT : None identified.

IMDG : None identified.

IATA : None identified.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not applicable.

Section 15. Regulatory information

United States

United States inventory (TSCA 8b) : All components are active or exempted.

SARA 302/304

SARA 304 RQ : Not applicable.

Composition/information on ingredients

No products were found.

SARA 311/312

Classification : COMBUSTIBLE DUSTS
RESPIRATORY SENSITIZATION - Category 1
CARCINOGENICITY - Category 1B

Composition/information on ingredients

Section 15. Regulatory information

Name	%	Classification
titanium dioxide	≥20 - ≤50	CARCINOGENICITY - Category 2
benzothiazole-2-thiol	<1.0	ACUTE TOXICITY (oral) - Category 3 SKIN SENSITIZATION - Category 1B CARCINOGENICITY - Category 1B
benzene-1,2,4-tricarboxylic acid 1,2-anhydride	<1.0	COMBUSTIBLE DUSTS ACUTE TOXICITY (inhalation) - Category 4 SERIOUS EYE DAMAGE - Category 1 RESPIRATORY SENSITIZATION - Category 1A SKIN SENSITIZATION - Category 1B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

⚠ **WARNING**: Cancer - www.P65Warnings.ca.gov.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health : 1 * **Flammability** : 0 **Physical hazards** : 0

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on MSDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

Health : 1 **Flammability** : 0 **Instability** : 0

Date of previous issue : **6/17/2021**

Organization that prepared the SDS : EHS

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
UN = United Nations

Indicates information that has changed from previously issued version.

Section 16. Other information

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

WARRANTY

AJ Manufacturing Co. Inc.
Kansas City, MO
Phone: (816) 231-5522

One Year Limited Exclusive Warranty

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