Addendum No. 2 to the Bidding Documents
Beacon WWTF Aeration Blower Replacement
Beacon, New York

Issued December 11, 2025

Bidders are informed that the Bidding Documents for the above-mentioned Project are modified, corrected, and/or supplemented as follows. Addendum No. 2 becomes part of the Bidding Documents and Contract Documents.

Acknowledge receipt of this addendum by inserting its number in paragraph 5.2 of the Bid Form. Failure to acknowledge receipt of the Addendum may subject the Bidder to disqualification.

Project Manual Changes

Item 2-1 Specification Section 01110

Delete the last sentence of Paragraph 2.1.A and **Replace** it with the following: "Submittal Information for the blowers is attached to this specification section. Equipment manuals will be provided to the Contractor when available".

Add the attached package of Blower Submittal Drawings to the end of Specification Section 01110.

Item 2-2 Specification Section 09900

Delete Specification Section 09900 in its entirety and **Replace** it with the attached version.

Item 2-3 Specification Section 15101

Delete paragraph 1.3.D.

Item 2-4 Specification Section 020800

Delete Specification Section 020800 in its entirety and **Replace** it with the attached Specification Section 020800.

Add the attached report entitled "Pre-Renovation Environmental Survey Report for Asbestos Containing Materials (ACM) & Lead-Based Paint (LBP) dated September 7, 2025 to the end of the Specification Section.

Item 2-5 Specification Section 028300

Delete the first paragraph in Section 2.0 and **Replace** it with the following:

"Sampling of suspected lead-based paints and/or coatings was conducted in support of this project. Lead-based coatings were identified as listed in the report entitled "Pre-Renovation Environmental Survey Report for Asbestos Containing Materials (ACM) & Lead-Based Paint (LBP) dated September 7, 2025. All painted surfaces should be treated as having lead containing coatings".

Drawing Changes

Item 2-6 Drawing M-101

Modify Note 4 to read as follows: "Provide Insulation on all Interior Upper Floor Aeration Discharge Piping and all Exterior Blower Intake Piping that is installed as part of this contract."

Item 2-7 Drawing M-301

Add the following to the end of Note 5: "Compare all dimensions against new equipment sizes/opening locations. Modify new piping components by providing a short radius elbow and/or adapter couplings if necessary to allow components to be successfully connected."

Modify the "G-003 detail 4" Reference to "S-002 Detail 4".

Item 2-8 Drawing E-002

Modify Sequence of Construction Step #5 by deleting "Provide Temporary backup power to MCC during installation of new fused disconnect and demolition of the two existing breakers" and replacing it with "Provide Temporary backup power to MCC during installation of new fuses and demolition of the two existing breakers".

Modify Sequence of Construction Step #7 by deleting "Remove existing fused disconnect and install new fused disconnect at MCC as shown" and replacing it with "Remove existing fuses and install new fuses at MCC as shown.".

Add the following to Sequence of Construction Note 1: "Contractor will evaluate the temporary power needs based on actual field conditions. The backup power per note #5 is to be provided for replacement of the fuses and the demolition of the two existing blower breakers. This work might require a power outage that will be over the owner's specified maximum outage."

Bidding Period Questions & Responses

The following responses/clarifications are based on questions raised during the bidding period.

1. **Question:** Can it be confirmed that there are no AIS or BABA requirements for this project?

   Answer: There are no AIS or BABA requirements for this project.

2. **Question:** Spec section 02800 3.17 mentions roofing & caulk to be removed as ACM, however, plans only call for wall tile adhesive glue as ACM per note 1 on D-102. Can this be further clarified.

   Answer: See Item 2-4.

3. **Question:** What is the quantity of asbestos material that needs to be removed?

   Answer: See Item 2-4.

4. **Question:** Under specification 020800, section 3.17 refers to items that do not match what is being called out on drawing D-102. Please clarify what is actually being abated.

Answer: See Item 2-4.

5. **Question:** Does this project have MBE/WBE Requirements?

   Answer: No.

6. **Question:** Does this project have an American Iron & Steel Requirement?

   Answer: See the answer to Question 1.

7. **Question:** Spec 15101 DI Pipe & Fittings, 1.3 Submittals, D states: "As specified in Section 01330, submit certifications for all iron or steel products indicating that all manufacturing processes occurred in the United States". Since our bid documents do not include spec 01330 would this requirement still apply?

8. **Answer:** See Item 2-3.

9. **Question:** Drawing S-101 shows two 18" diameter cores for the new 14" diameter blower discharge flanged piping to pass through. A 14" flange has a 21" diameter outside diameter – which is too large to pass thru an 18" diameter hole. How should this be resolved?

   Answer: See Item 2-7.

10. **Question:** Reference 028300 Lead-Containing Coating, 2.0 Description/Scope of Work includes this sentence: "Please see the attached Summary Report for lead-based paints, dated January 3rd, 2024". We have not found this summary report in our bid documents. Can this summary report be provided?

    Answer: See Item 2-4. The report has been added to Specification Section 020800.

11. **Question:** Ref 020800 Asbestos Abatement, 3.17 Beacon Wastewater Plant (Exteriors). This section references abatement drawings. We have not found abatement drawings in our bid documents. Can these abatement drawings be provided?

    Answer: See Item 2-4. There are no Abatement Drawings on this project.

12. **Question:** Reference 09900 Painting, 3.7, Existing Surfaces to be Recoated. This section refers to Section 13286. No Division 13 specs were included in our bid documents. This section also refers to painted surfaces containing PCB or suspected to contain PCBs. For this project are there any surfaces that need to be painted that contain PCBs?

    Answer: See Item 2-2. Section 3.7 has been deleted from the current version.

13. **Question:** Special Conditions Section SC-5.06 references a Sept 7th 2025 Pre-Renovation Environmental Survey Report for Asbestos Containing Material (ACM) and Lead-Based Paint (LBP) that can be examined at the engineer's office. Can this report be emailed to us?

    Answer: See Item 2-4.

14. **Question:** It would greatly help if a painting scope of work, specific to this project was provided. Is it required to paint any of the existing piping? Is it required to paint any of the existing conduits? Is it required to paint the floors (upper and lower)?

    Answer: See Item 2-2. The painting scope of work is called out in Paragraph 1.3.A.

15. **Question:** Reference Drawings E-002 and E-003. Key Note #2 on E-003 contradicts "Sequence of Construction" Note 7 on E-002. Key Note #2 indicates just fuses being replaced in existing fused disconnect switch. Sequence of Construction Note #7 indicates new fused disconnect switch being installed. If just the fuses in the existing disconnect switch are being replaced would a generator be required during this task since it would only take a few minutes to replace the fuses?

    Answer: See Item 2-8. Only fuses in the fused disconnect are to be replaced.

16. **Question:** Reference Drawing M-101 Note #4 which states "Provide Insulation on all Aeration Discharge Piping Inside Upper Floor of the Blower Building and Exterior Blower Intake Piping". Please confirm that this applies only to the new aeration discharge piping, on the upper floor, installed as part of this contract and does not include any existing aeration discharge piping.

    Answer: See Item 2-6.

17. **Question:** Does "Exterior Blower Intake Piping" mean the entire length (Interior & Exterior) of the 8" stainless steel intake piping gets insulated or just the interior section?

    Answer: See Item 2-6.

18. **Question:** Please indicate where asbestos abatement is to be performed.

    Answer: See Item 2-4.

19. **Question:** Please indicate where the lead abatement is to be performed.

    Answer: See Item 2-5.

20. **Question:** Please consider pushing the bid date to later next week.

    Answer: The bid date will not be extended at this time.

END OF ADDENDUM NO. 2

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EQUIPMENT SUBMITTAL

KAESER COMPRESSORS

FBS720L-SFC 100hp Screw Blower Package

Project Name:

Beacon, NY

Warning/Disclaimer Statement:

WARNING NOTICE:

The contents of this submittal package are proprietary to Kaeser Compressors, Inc. AND MAY NOT BE ALTERED IN ANY WAY. ALTERATION OF THE INFORMATION CONTAINED HEREIN MAY RESULT IN MISUSE OF EQUIPMENT WHICH COULD RESULT IN SERIOUS INJURY OR DEATH. KAESER COMPRESSORS, INC. ASSUMES NO LIABILITY FOR ANY ALTERED INFORMATION. This information may also contain privileged and confidential information. Under no circumstances may this document or any part of this document be provided to unauthorized persons/companies without the written permission of Kaeser Compressors, Inc.

Table of Contents

Blank

KAESER COMPRESSORS®

Built for a lifetime.

Rotary Screw Blower Packages

CBS-HBS Series

Capacities from: 190 to 5650 cfm
Pressures from: 4.4 to 15 psig

kaeser.com

CBS, DBS, EBS, FBS, GBS, HBS Series

KAESER rotary screw blowers leverage our decades of experience in making the most energy efficient rotary screw compressors with the world-renowned SIGMA PROFILE. Just like their compressor counterparts, KAESER's screw blowers deliver more air for less energy. Screw blowers have isentropic efficiencies well above lobe and multistage blowers, and due to our excellent specific performance over a wide operating range, our wire-to-air efficiencies meet or exceed turbo blowers in many applications. This makes them ideal for low pressure applications with varying flow demand. Available in both fixed and variable speed, these energy-efficient, state-of-the-art blower systems are delivered complete and ready to operate.

Efficient operation

KAESER rotary screw blowers consume up to 35 percent less energy than conventional rotary lobe blowers. The combination of a blower featuring energy-saving SIGMA PROFILE rotors, flow-optimized components, efficient power transmission and high-efficiency drive motors ensures an exceptional performance, guaranteed by KAESER in accordance with the stringent tolerances of ISO 1217.

Long-term dependability

Renowned worldwide for the quality of their design, components and manufacture, KAESER products guarantee long-term reliability. High-quality features include durable rotor bearings, a dependable power transmission, precision-dimensioned drive motors, a sound enclosure with enhanced cooling air flow, SIGMA CONTROL® 2 machine controller for efficient and dependable operation – and many more features.

Air at the push of a button

KAESER screw blowers are turnkey systems, offering the best possible combination of quality construction, reliable performance, energy efficiency and ease of ownership. Our complete package design eliminates time spent specifying, procuring and assembling blower system components, and KAESER takes complete responsibility for all of the blower package. All of our screw blowers are complete with noise insulated cabinets, inlet and outlet silencers, motors and drives. The intelligent SIGMA CONTROL 2 on each blower optimizes machine performance via various control modes, and a full suite of sensors provides active condition monitoring to protect the machine.

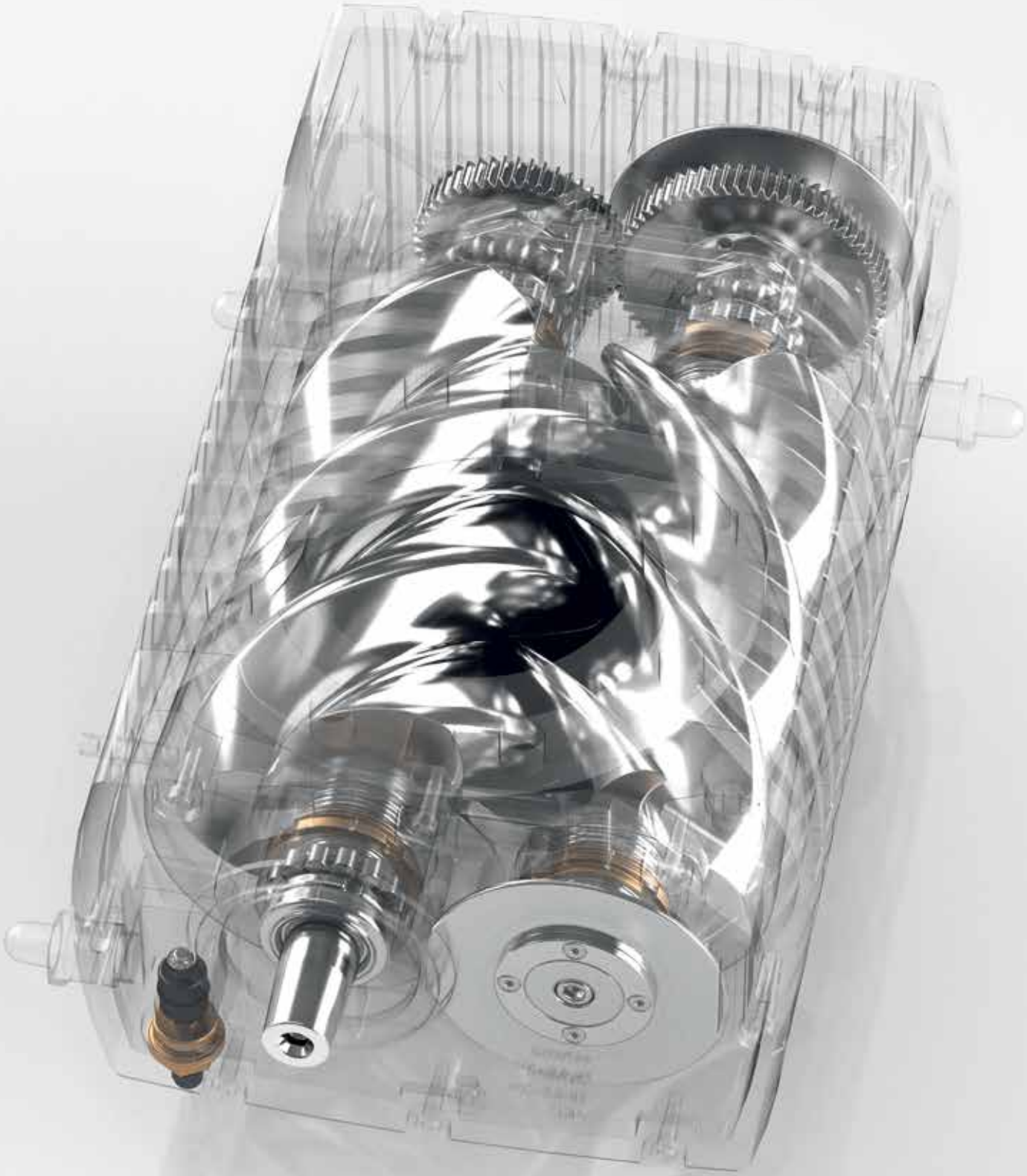
Both fixed (STC) and variable speed (SFC) units arrive fully wired and UL certified. The blowers' compact design facilitates installation and uses minimal floor space. KAESER screw blowers arrive on site ready to run. This saves time and labor, and greatly reduces common integration errors.

International Organization for Standardization
ISO
1217:2009

Guaranteed performance specifications

To ensure that the projected savings are actually achieved during operation, KAESER quotes effective overall power consumption figures, as well as the usable flow rate, in accordance with the stringent tolerances of ISO 1217, Annex C or E (as applicable).

SIGMA PROFILE: Superior Reliability and Performance

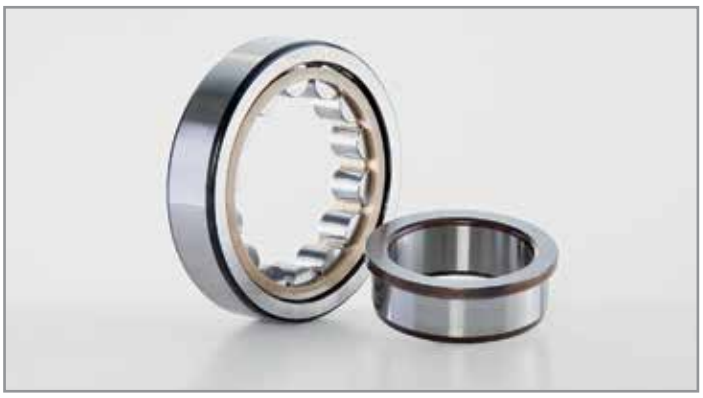


Blower with SIGMA PROFILE

KAESER's high-efficiency blowers deliver near constant specific package input power. Equipped with energy-efficient SIGMA PROFILE rotors, they ensure maximum air delivery while keeping power consumption to an absolute minimum.

Ensured lubrication

The fluid and cooling air flow design of our blowers reduces the amount of oil needed to effectively lubricate bearings and gears without compromising reliability. Standard oil level and temperature sensors are located so that they always give accurate readings, even as oil levels fluctuate.



Durable bearings

Four robust cylindrical roller bearings absorb the continuously changing radial forces and are rated to ensure long screw blower service life. The rollers are encased in high-tech cages for optimum lubrication at all speeds.

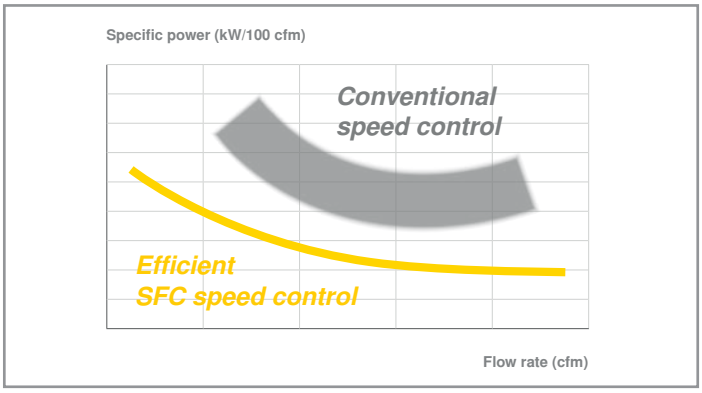
Dependable seals

Field-proven in KAESER screw compressors, the sliding ring seal for the rotary transmission input drive shaft on the blower housing is completely maintenance-free and reliable, even in hot or dusty environments.

Superior efficiency across wide load range

Lower costs with more flow

Synchronous reluctance motors achieve significantly higher efficiency in the partial load range than asynchronous motors. This helps achieve savings of up to 10% compared with conventional variable-speed systems.



Optimized specific package input power

The near constant specific input power across a wide control range of the variable speed machine offers significant energy savings across the entire operating curve.

Efficient drive systems

KAESER screw blowers are equipped with Super Premium Efficiency motors (IE4 and IES2), which stand out for their remarkable energy-saving potential thanks to extremely high levels of efficiency. Saving money has never been so easy!

Fully integrated drive

Using variable speed control, the SFC frequency converter adjusts flow rate to match the actual air demand of the process application. Everything is delivered ready for immediate operation, since all programming and parametrization is carried out at the factory.

Advance control and protection

The blower controller

The SIGMA CONTROL 2 ensures efficient blower control and system monitoring at all time. User interface displays machine status in real-time and signals at the analog and digital inputs, lists warning and alarm messages and graphically displays pressure, temperature and speed trends.

Seamless integration

SIGMA CONTROL 2 has superior communications capabilities and enables plant integration. Access blower controller via the integrated web server. EtherNet/IP, ModBus, Profinet®, Profibus®, Devicenet™, and other industrial communications interfaces are also available as plug-in options for seamless integration into plant control/monitoring systems.

Condition monitoring

A wide range of sensors and switches for monitoring pressure, temperature, speed, oil level and filters ensures dependable operation of the blower, while allowing remote monitoring and visualization of the operating status.

EMC certified complete system

The SFC control cabinet and SIGMA CONTROL 2 are tested and certified for electromagnetic compatibility, both as individual components and as complete blower systems, in accordance with EMC Directive EN 55011 for Class A1 industrial power supplies.


KAESER
SFC


HBS 1600 M
KAESER

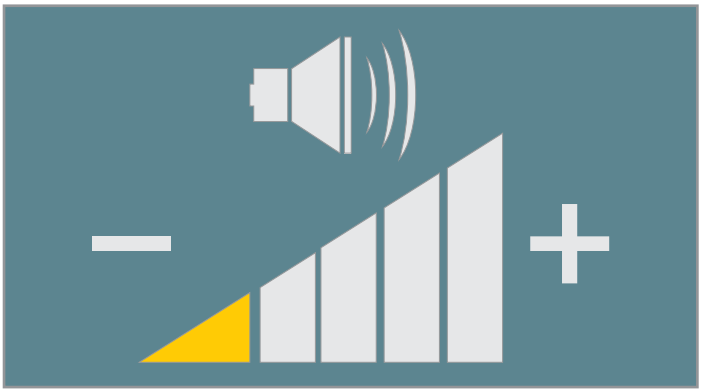
Compact and quiet

Compact

Our superior design integrates all system components - blower, drive motor, power transmission, silencers, sensors, controller and electrical cabinet - into a space saving package that still provides excellent service access.

Side-by-side installation

CBS - FBS models are designed to allow all maintenance work to be carried out from the front of the unit, so these units can be installed side-by-side for even more space savings.



Pulsation dampers

Efficient inlet and discharge absorption silencers mitigate unwanted process air pulsations, across a wide frequency range to reduce noise in piping. These silencers are flow optimized to reduce pressure losses.

Low noise - high comfort and safety

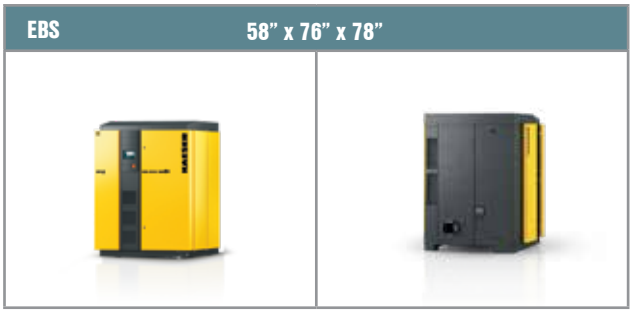
A complete enclosure with sound dampening panels minimizes machine noise to 75 dB(A) or below, even on our largest units.

Views

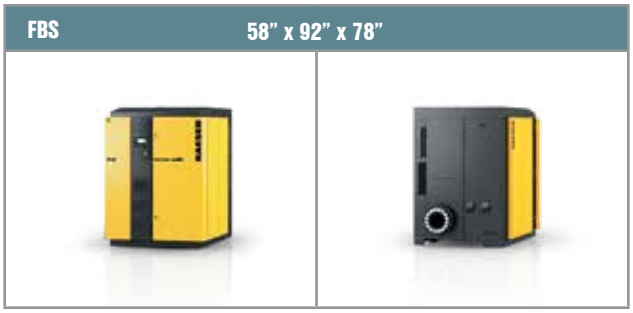
CBS 43” x 54” x 66”

DBS 43” x 58” x 66”

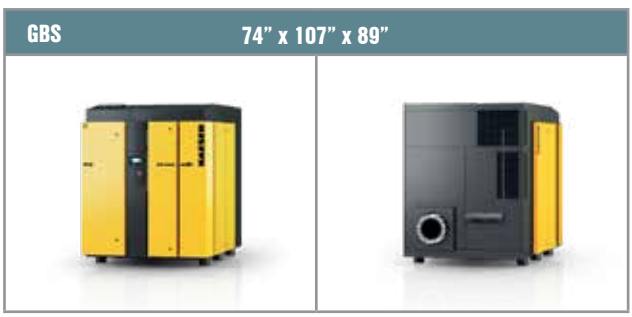
EBS 58” x 76” x 78”



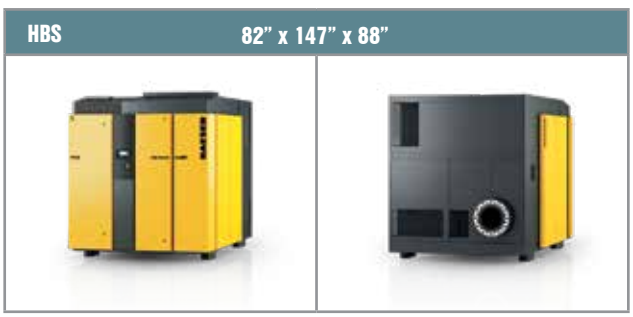
FBS 58” x 92” x 78”



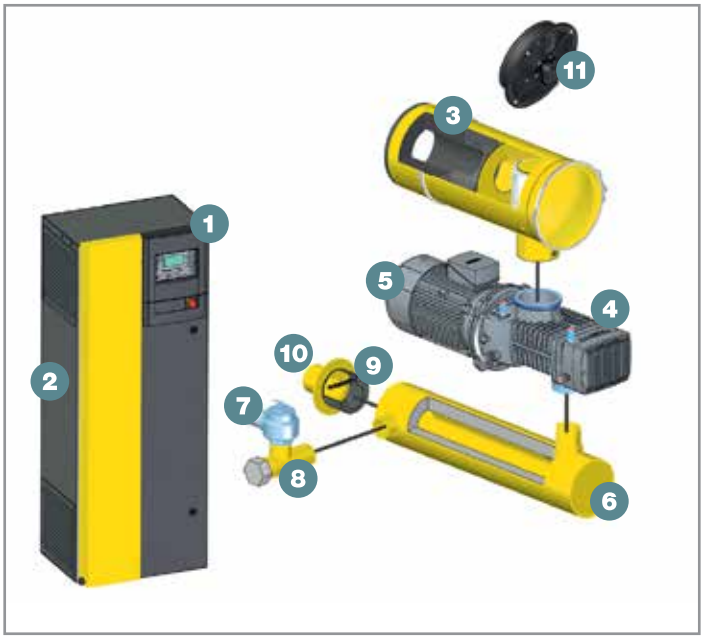
GBS 74” x 107” x 89”



HBS 82” x 147” x 88”



Component Schematic



(01) SIGMA CONTROL 2 controller

(02) Control cabinet

(03) Intake silencer with filter

(04) Blower with SIGMA PROFILE

(05) IE4/IES2 - Super Premium Efficiency motor

(06) Discharge Silencer

(07) Safety relief valve

(08) Unloaded-start valve (optional)

(09) Check Valve (optional)

(10) Discharge compensator

(11) Sound enclosure fan

Technical specifications

Model	Max. Flow Rate* cfm	Max pressure differential psig	Vacuum in. HgV	Max. rated motor power hp	Pipe Connection in.	Dimensions WxDxH in.	Max. weight lbs.
CBS 121 L SFC	445	10.2	-	25	3" Sleeve	43 x 54 x 66	1500
CBS 121 M SFC	364	15	16.2	30			
CBS 121 L STC	441	10.2	-	25			
CBS 121 M STC	360	15		30			
DBS 221 L SFC	812	10.2	-	40	4" Sleeve	43 x 58 x 66	2200
DBS 221 M SFC	777	15	16.2	50			
DBS 221 L STC	671	10.2	-	30			
DBS 221 M STC	636	15		50			
EBS 410 CL SFC	1448	10.2	-	50	6" Sleeve	50 x 76 x 72	3086
EBS 410 CM SFC	1059	14.5	16.2				
EBS 410 L SFC	1448	10.2	-	75		58 x 76 x 78	3351
EBS 410 M SFC	1412	15		100			
EBS 410 CL STC	1342	10.2	-	50		50 x 76 x 72	3086
EBS 410 CM STC	1059	14.5					
EBS 410 L STC	1412	10.2	-	75		58 x 76 x 78	3500
EBS 410 M STC	1412	15		100			
FBS 720 L SFC	2560	10.2	-	125	8" Flange	58 x 92 x 78	4850
FBS 720 L STC	2525	15	16.2	75			
FBS 720 M SFC		10.2	-	150			
FBS 720 M STC		15		100			
GBS 1050 L SFC	3712	10.2	-	175	10" Flange	74 x 107 x 89	9038
GBS 1050 M SFC	3683	15	16.2	200			
GBS 1050 L STC	3676	10.2	-	175			
GBS 1050 M STC	3648	15		200			
HBS 1600 L SFC	5650	10.2	16.2	250	12" Flange	82 x 147 x 88	13227
HBS 1600 M SFC		15	-	335			

** Performance specifications as per ISO 1217 Annex C for STC version, Annex E for SFC version*

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KAESER COMPRESSORS®

ROTARY SCREW BLOWER

PACKAGE RECOMMENDATIONS

Date: 10-02-2025
Page: 1

Customer: Beacon, NY

Prepared by: C. Crosson

Design data:

Operating mode:	Gauge pressure	Flow medium:	Air
Elevation:	20 feet / 6 meters	Pressure differential:	7.5 psi
Inlet pressure:	14.7 psia	Discharge pressure:	22.2 psia
Inlet temperature:	104 °F		
Air Humidity:	50%		

Technical data:

Package type:	**Screw SFC**	Maximum pressure differential:	8.6 psi
Package:	**FBS720L**	Gear Set:	3
Blower:	Sigma B168		
Drive motor:	100.0 hp	Inlet flexible connector:	Piped- 8" Sleeve
Drive motor power:	460V / 3 / 60Hz	Discharge flexible connector:	Flanged- 8" ANSI

Performance data:

	Min Frequency	Design Point	Max Frequency
Speed	1800 rpm	6700 rpm	6720 rpm
Inlet flow Q1*:	597 cfm	2563 cfm	2571 cfm
Air flow Q1 (standard):	544 scfm	2333 scfm	2340 scfm
standard conditions:14.7 psia, 68°F, 36% RH			
Discharge temperature:	194 °F	194 °F	194 °F
Blower shaft power:	21.8 hp	92.5 hp	92.8 hp
Package input power:	19.4 kW	74.1 kW	74.4 kW
Specific performance:	3.25 kW/100-cfm	2.89 kW/100-cfm	2.89 kW/100-cfm

Sound pressure level**:	74 dB(A)
Sound power level**:	92 dB(A)
Estimated weight:	4645 lb
Dimensions (W x L x H):	57.0 x 85.0 x 78.0 inches

*** Performance data to DIN ISO 1217- Annex E**

****Measured to DIN EN ISO 2151, figures ± 3 dB(A), with isolated pipework**

Customer: Beacon, NY

Prepared by: C. Crosson

Equipment Scope:

Inlet silencer
Discharge silencer
Inlet filter (grade G4)
Pressure relief valve(s)
IP 55 TEFC SynRM motor - IE4+ Rated (>NPE)
Drive motor temp protection PT100
Sound enclosure with vent fan
Vibration isolators
Direct coupled gear driven system
GRD mechanical input shaft sealing

Flexible connectors on inlet and discharge
Flap style check valve (plate)
Motor and VFD together meet IES2 combined efficiency standard

Enclosure safety high temperature switch
Oil level sensor (x2)
- drive side
- gear side

Pressure transducer
- inlet pressure
- discharge pressure

PT100 temperature probes (x3)
- inlet temp
- discharge temp
- oil temp (gear side)

Optional accessories included

Installation Location: Indoor

Controls Scope:

Main control center (x1): Sigma Control 2 (SC2)
UL 508A control panel
E-Stop button
Remote on/off
Phase sequence relay
Noise suppression filter Class A
Integral VFD

RFID (Radio frequency identification sensor for secure log-on)
Detailed warning and alarm messages at SC2
Group warning and alarm digital outputs
Blower on and running digital outputs

Control mode: Pressure Regulation
Comm. module: EtherNet/IP

Comments/ Customer requirements:

Notes:

a. Motors, silencers, sensors, vfd, cabling and controller are all factory mounted.

b. The SC2 is equipped with a Ethernet port for viewing via the built in web browser. Appropriate communication module must be selected for remote communication.

c. Factory control mode is pressure regulation. Local speed control, local flow control, or remote speed control (via 4-20 ma signal) can be selected in the field.

Installation Data Sheet - Screw Blower

Series: FBS.2
Document Number: TI.BIDS-043
Version: 1.0
Revision Date: 04/24/2023

Package Model	FBS 720 SFC (L ~~& M~~)				
Electrical Data					
Horsepower			**100**		
Voltage (3ph/60Hz)			460V		
Short Circuit Current Rating (SCCR) [kA] 460V/3ph/60Hz			50		
Package FLA +/- 10%			129.2		
Disconnect Fuse [Amp]			150		
Recommended Wire Size (75°C or higher) [AWG]			1 x 4 x 3/0		
Maximum Feed Terminal [AWG]	See wiring diagram				
Motor Data					
Insulation Class			F		
Enclosure Type			TEFC		
Type			SynRM (IES2)		

Notes:
1. Time delay (dual element) fuse; Class J ≤ 600A (e.g. AJT).
2. Fuse and wire sizes determined in accordance to NEC 240.6, 430.52 and tables 250.122, 430.248, 430.250.
3. Breaker should be suitable for a heavy duty starting load and of inverse time delay design that complies to regulations outlines in NEC 430.52.
4. SFC Units come standard at 460 volts.
5. Ground wire size should be equal to conductor size.

SFC Operating Modes

External Speed Control
The speed of the drive motor is controlled via an externally-supplied analog signal within the programmed speed range between n-min and n-max in accordance to machine design.

Fixed Speed
The speed of the drive motor is controlled by an adjustable value between 0% and 100% of machine speed which is set at the Sigma Control 2.

Pressure Regulation
When machine runs in pressure regulation mode, the frequency converter compensates for deviations between the set point pressure and the actual pressure by changing the speed of the drive motor. The variation in speed determines the air delivery of the machine to match the air consumption of system while maintaining the system pressure so long as the unit is maintained within the control range of the machine (Vmin and Vmax).

Oil System Data	
Drive End Capacity [qt.]	2.7
Gear End Capacity [qt.]	2.3
Oil Type (Synthetic)	G-680
Working Pressure	
FBS 720 L SFC pr	Continued working pressures below 2.2 psig are not permitted
~~FBS 720 M SFC pr~~	~~Continued working pressures below 4.4 psig are not permitted~~

Package Connections					
HP			**100**		
Width [in.]			57 1/2		
Depth [in.]			92 1/2		
Height [in.]			77 15/16		
Floor [sq.ft.]			36 73/78		
Weight [lb.]			4645		
Connection Size [Inlet (optional)]			8" Pipe		
Connection Size [Outlet]			8" ANSI 125/150		

Installation Data Sheet - Screw Blower

Series: FBS.2
Document Number: TI.BIDS-043
Version: 1.0
Revision Date: 04/24/2023

Package Model	FBS 720 SFC (L ~~& M~~)

General Information

Floating Relay Contacts

Contacts:

- X12:	1 and 2	Operation
- X12:	3 and 4	Ready for operation
- X12:	5 and 6	Group Alarm
- X12:	7 and 8	Group Warning

Ambient and Intake Conditions

Permissible ambient temperature [°F]*	+32 - +113
Permissible intake temperature [°F]*	+5 - +113
Relative humidity [%]	0 - 80
Maximum elevation [ft.asl]*	3280

**contact Kaeser about deviations in temperature or altitude*

Remote On/Off

Contacts (not floating): powered 24 VDC
-X15: 5 and 6
Function:
- from open to closed: Machine switches on
- from closed to open: Machine switches off

External Alarm

Contacts (not floating): powered 24 VDC
DI: 1.08
Function:
- the machine will switch off in the event of this external fault

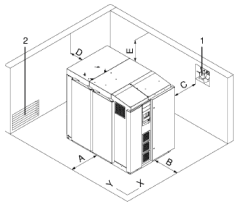
Ventilation of Blower Room

Air Inlet Opening	6.7 sq.ft.
Cooling Fan Capacity (forced ventilation)	2450 cfm
Max Heat Rejection	35,740 BTU/hr

Ventilation values based on 2524 CFM(FAD) @ 14.5 psig dP, 150 hp, maximum room ambient of 113°F, Suction temperature of 104°F, 9 ft of discharge pipe

Model shown for reference only
Actual duct size may vary with installation

1 Exhaust Fan
2 Ventilation Inlet Air Opening



Foundation in the cross direction (X) must be level, inclination max. 0.8°

Foundation in the longitudinal direction (Y) must be level, inclination max. 2.0°

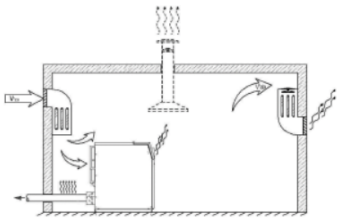
*The foundation must be firm, level and capable of bearing the weight of the machine.

Recommended machine placement and dimensions:

		Inches
A	Left side clearance =	See Table 1
B	Front clearance =	See Table 1
C	Right side clearance =	See Table 1
D	Back clearance =	39.4
E	Height clearance =	See Table 1

Table 1

Machine	Installation Type	Clearance A	Clearance B	Clearance C	Clearance E
FBS 720 L pr, FBS 720 M pr	Beside another machine	13.8	59.1	13.8	59.1
FBS 720 L pr, FBS 720 M pr	Next to a wall	19.7	59.1	19.7	59.1



It is recommended to extract the exhaust air from the upper third of the room as this is where the heat collects. The room ventilation openings should be arranged that the current of cooling air flowing through the room passes over the blower inlet and exhaust ports and, if possible, should leave no stagnant air in the room. (A thermal short circuit must be avoided, i.e. discharged cooling air must not find its way to the cooling air inlet.)
The blower must not be positioned so near to a wall that the inflow of cooling air is obstructed.

Pipework should be insulated against heat emission.

If the blower station is located in the middle of a large hall its exhaust air can be extracted by means of a duct positioned above the exhaust port (illustrated in broken lines).

Data Sheet KAESER Blower (Machine)			
Data sheet ID		21e800fb	
Created by		Caleb Crosson / Kaeser Compressors Inc.	
Contact		caleb.crosson@kaeser.com	
Date		10/7/2025	
Project description			
Blower		FBS 720 L-SFC-G3	
Operation mode	Pressure operation	**Medium**	Air

Performance-relevant components

☑ Filter intake air G4	☑ Non return valve	☑ Frequency converter
☑ Silencer intake air	☑ Sound enclosure	☑ EMC filter
☑ Silencer discharge air	☑ Cooling air ventilator	

Design details	**Options**
Intake: ○ Room ◉ Pipe	☐ Unloaded start up valve ☑ Sliding ring

Rated data machine at mains operation	
Rated speed blower [1/min]	6493
Electrical grid [V/Ph/Hz]	460/3/60
Mains voltage [V]	460
Rated power motor [kW/HP]	75.0 / 100.0
Efficiency motor [%]	96.10
Max. Lp(A) / Lw(A) [dB(A)][h]	74 / 91.7
Set pressure safety valve pSV [psi]	11.9

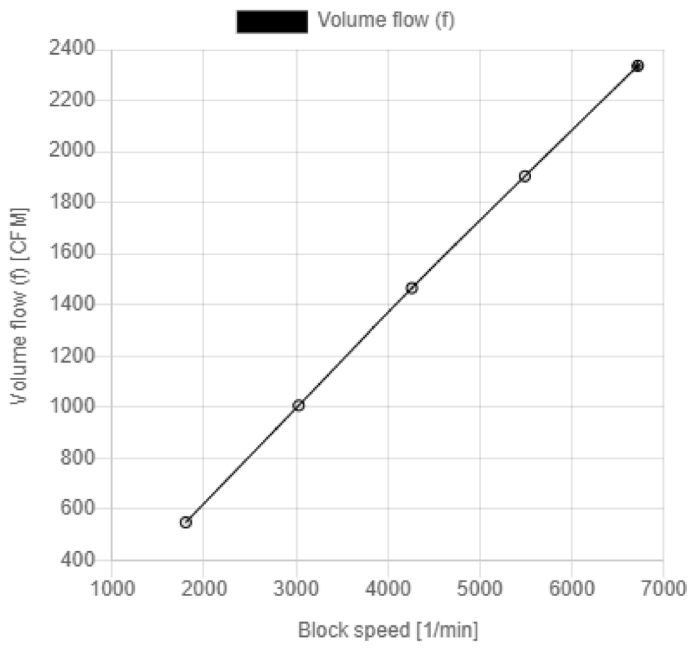
Intake conditions of process air into machine	
Intake pressure p_1 [psi]	14.7
Intake temperature ϑ_1 [°F]	104.0
Relative humidity φ [%]	50.00
Differential pressure Δp [a] [psi]	7.5
Discharge pressure p_2 [psi]	22.2
Altitude a.s.l. [ft]	20

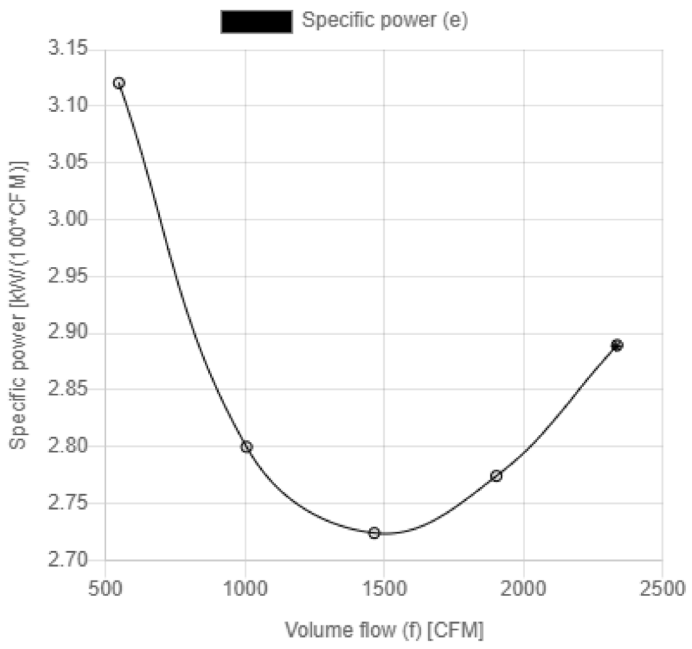
Performance data under project conditions

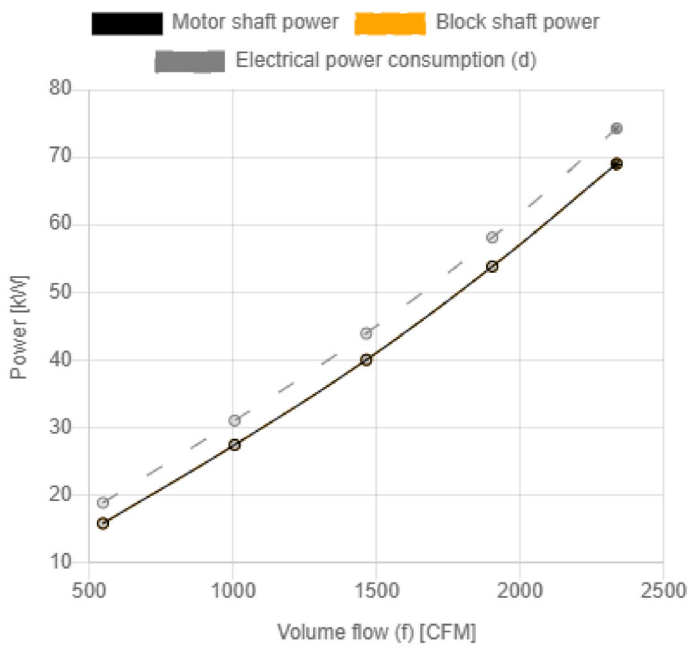
Volume flow		1 ($\dot{V}_{min}$)	2 ($\dot{V}$)	3 ($\dot{V}$)	4 ($\dot{V}$)	5 ($\dot{V}_{max}$)	Design point
n_{block}	1/min	1800	3030	4260	5490	6720	6711
$\dot{V}$ [b]	CFM	603	1107	1611	2093	2569	2566
$\dot{V}_{Standard}$ [f]	CFM	548	1007	1465	1903	2336	2333
$\dot{m}_{dry}$	lbs/min	40.9	75.0	109.1	141.8	174.1	173.8
$P_{blower\ shaft}$ [c]	hp	21.4	37.3	54.4	73.1	93.8	93.6
$P_{overall}$ [d]	kW	18.8	31.0	43.9	58.1	74.2	74.1
$p_{specific}$ [e]	kW/(100*CFM)	3.12	2.80	2.72	2.77	2.89	2.89
$eta_{isentropic}$ [i]	%	67.06	74.74	76.82	75.43	72.42	72.45
ϑ_2 [g]	°F	190.4	188.0	187.7	189.6	193.6	193.6

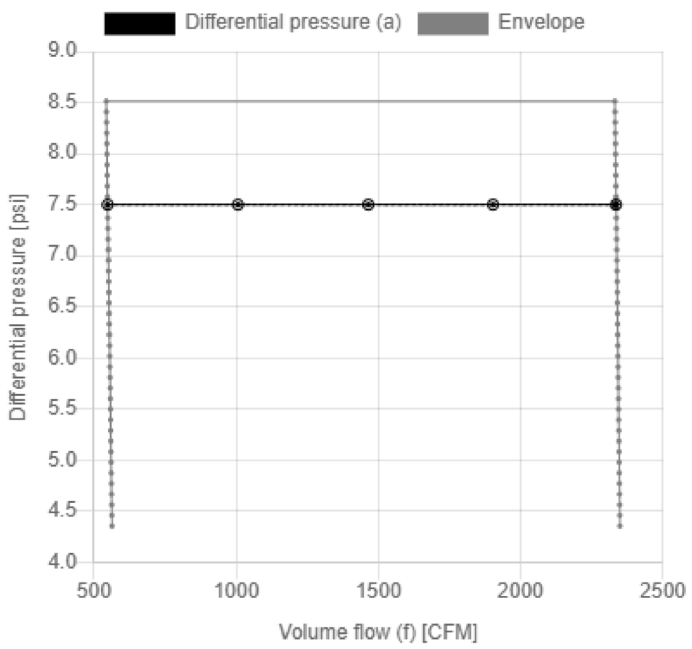
V1_B_FBS720L_75_6493_3_1_460/3/60_460/3/60_1_1_0_1_US v1.4.3

Data Sheet KAESER Blower (Machine)









a: Machine pressure differential between inlet and outlet (compensator)

b: Air-mass flow at machine discharge as usable volume flow at intake. Tolerance on deviation of quoted to measured data to ISO 1217 Annex C/E. Air flow at intake conditions:
53-530 cfm: ±5%, >530 cfm: ±4%

c: With consideration of the pressure losses of all flow contacting machine components

d: Machine total power consumption of all relevant electrical components in addition to the pressure losses

e: Tolerance on deviation of quoted to measured performance data according to ISO 1217 C/E for specific power ($P_{overall}/\dot{V}$):
53 -530 cfm: ±6%, > 530 cfm: ±5%

f: DIN 1343: in physical normal state 14.7 psia, 32 °F, dry air 0% r.H. ($\dot{V}_{i.N.}$)
US-Standard (CAGI): 14.7 psia, 68°F, air 36% r.H. ($\dot{V}_{Standard}$)

 V1_B_FBS720L_75_6493_3_1_460/3/60_460/3/60_1_1_0_1_US v1.4.3

Data Sheet KAESER Blower (Machine)	KAESER COMPRESSORS®
g: Discharge temperature (calculated value)	
h: DIN EN ISO 2151 and ISO 9614-2, 1m distance, figures ±3 db(A), with sound isolated pipework	
i: calculated from $P_{overall}$ and $\dot{V}$	
When measuring performance data, the values quoted under project conditions will be converted to test conditions as per the specified standard.	

 V1_B_FBS720L_75_6493_3_1_460/3/60_460/3/60_1_1_0_1_US v1.4.3

: Center of gravity
Position marginally dependent on design

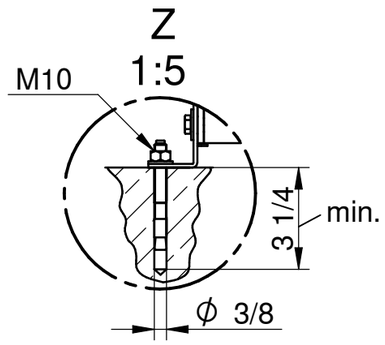
SFC / STC						
Model	Nominal power	A/A***	X*	Y*	Z*	Weight **
FBS 720	60 hp	211/197	33 7/8 / 33 1/16	34 5/8 / 33 7/15	38 9/16 / 38 9/16	~4369/4440 lb
	75 hp		33 7/8 / 33 7/16	34 5/8 / 33 7/8	38 9/16 / 39	~4369/4605 lb
	100 hp		33 7/16 / 33 7/16	34 1/4 / 34 1/4	39 / 39 3/8	~4645/4782 lb
	125 hp		33 1/16 / 0	34 1/4 / 0	39 3/8 / 0	~4720/2 lb
	150 hp		32 11/16 / 0	33 7/8 / 0	40 9/16 / 0	~4841/0 lb

* (approximate dimensions)

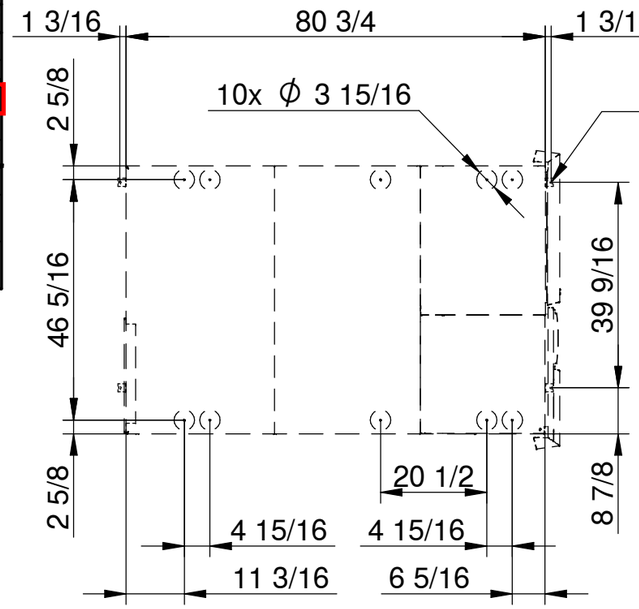
** Nominal value: Actual value depends on design

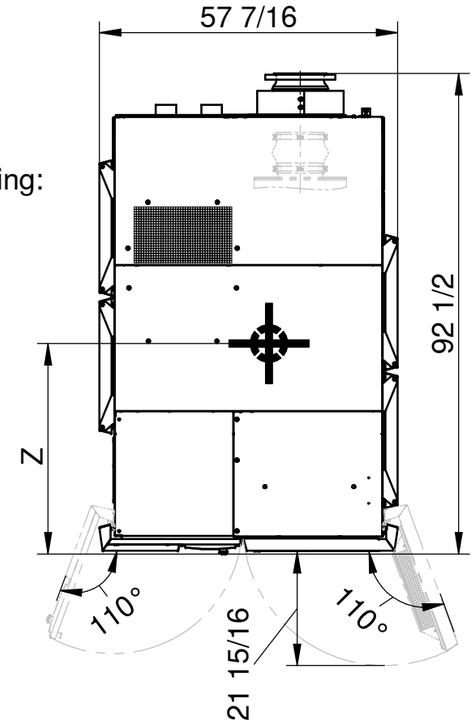
*** Dimensions without check valve

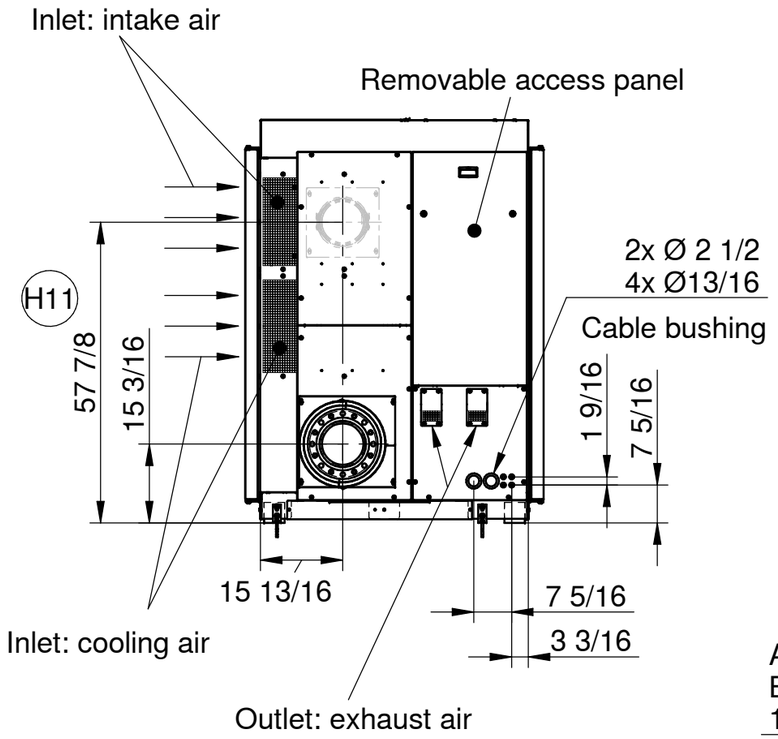
Dimensions shown in inches

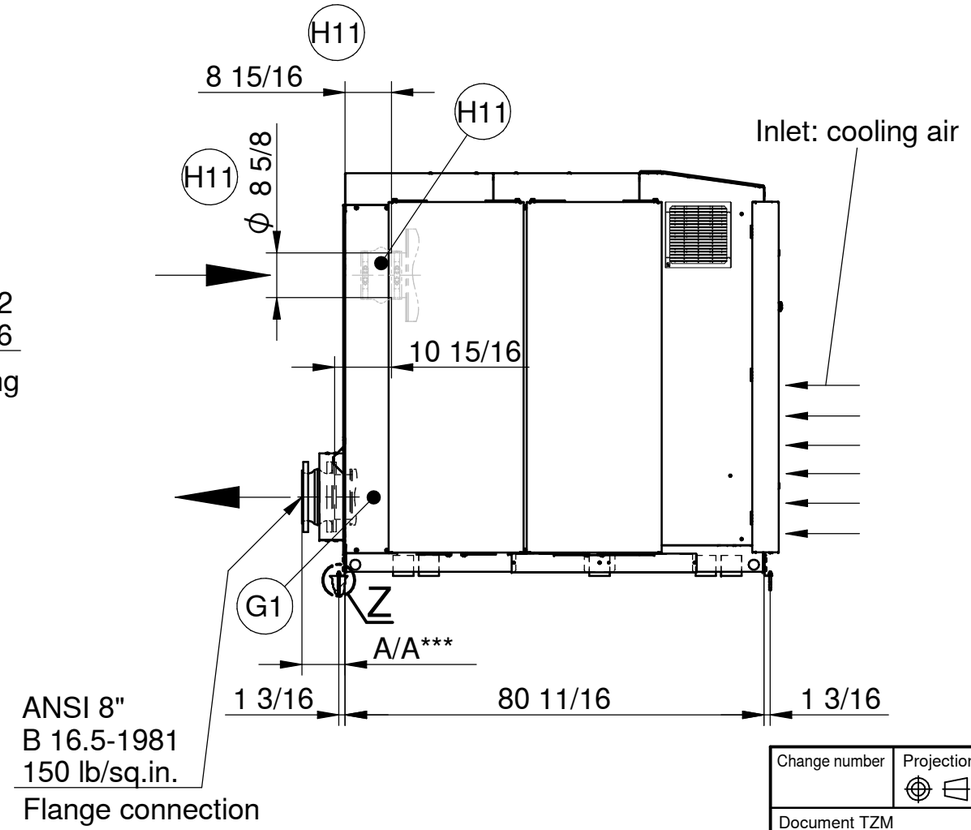


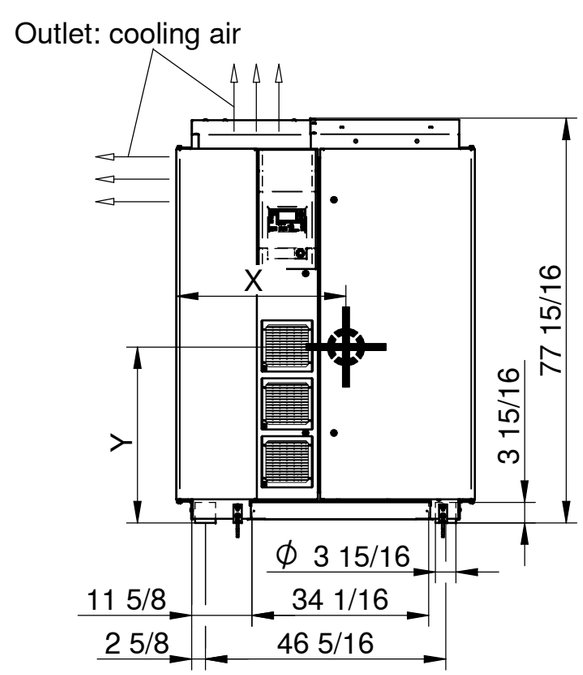
Foundation plan











G1	Check valve
H11	Intake from pipeline

Change number	Projection	Scale		Date	Name	KAESER KOMPRESSOREN
		1:30	Drawn	30.03.2022	BOGISCH2	
Document TZM 10552869 USE 00		Original A3	Edited	07.12.2022	BOGISCH2	Language USE / Sheet 1 / 1
			Released	08.12.2022	MLYNEK1	
Document TZD 10552869 D 00		Designation FBS.2 SFC/~~STC~~ pr				
Status Released		Dimension and connection dim.				24

Stand 18_02_2021

2.11 Power supply specifications

The specified cable cross sections refer to multicore copper conductors of temperature class 75 °C and are adapted for an ambient temperature of 40 °C in accordance with 2023 NEC 310.14, 310.15, 310.16 and Table 310.16.

Check and measure the cable cross section in accordance with 2023 NEC 110.14(C), 220.3, 310.14, 310.15, 310.16, Table 310.15(B)(1)(1), Table 310.15(C)(1), 430.6, 430.22, 430.24, 670.4(A), as well as any further local regulations.

Select time delay fuses with dual elements in accordance with 2023 NEC 240.6, 430.52 and Tables 430.52(C)(1), 430.248 and 430.250.

Where local regulations permit, use an earthing conductor of the same size as the current-carrying conductors. Minimum sizing of the grounding conductor as per Table NEC 250.122 from 2023 is not permitted, nor is the use of piping as the sole grounding connection.

2.11.2 C38 SIGMA FREQUENCY CONTROL

Note on the lambda factor:

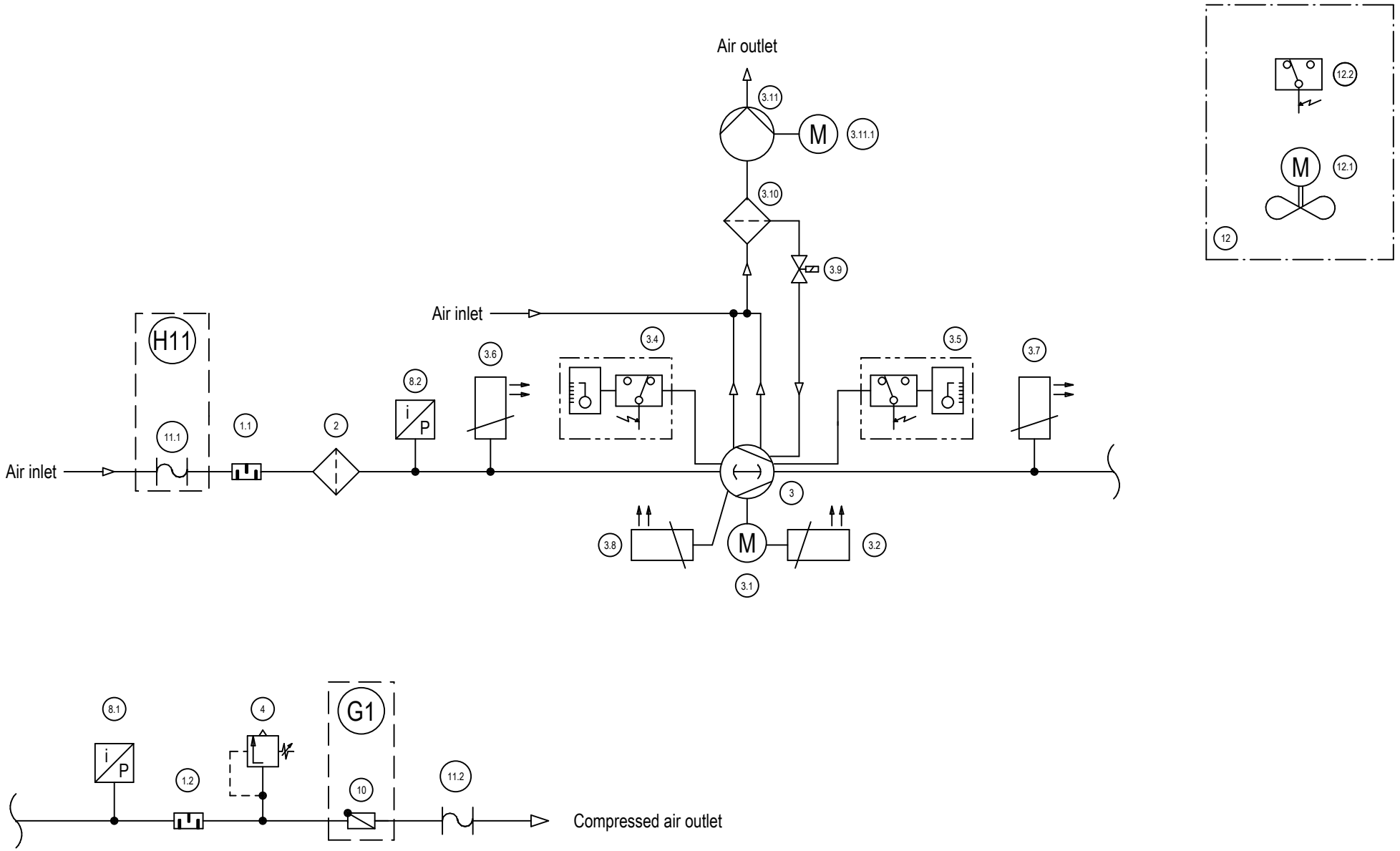
In addition to their fundamental oscillation, non-sinusoidal variables also contain harmonics for which no fixed phase shift angle Φ (phi) can be specified. Instead, the power factor λ (lambda) must be used. In electrical engineering, the power factor λ denotes the ratio of the active power value P to the apparent power value S.

In the event of deviating network characteristics and therefore lambda value at the user-end, the full load current and supply cable cross section may need to be reassessed.

Rated voltage: 460 V / 3 / 60 Hz

Rated power [hp]	60.0	75.0	100.0	125.0	150.0
Backup fuse [A]	90	110	150	175	225
Connecting cable [AWG/MCM]	1x 4x1/0	1x 4x2/0	1x 4x3/0	2x 4x1/0	2x 4x2/0
Current consumption [A]	79.0	96.3	129.2	154.6	187.9
Power factor [λ] (lambda)	0.927	0.920	0.925	0.922	0.922

Tab. 16 Connection data 460 V / 3 / 60 Hz



c				Date	18.03.2022	KAESER KOMPRESSOREN	P&I diagram				
b				Drawn	Plau		Screw blower				
a	Ä-Nr.: 52162			Released	Mlynek		FBS SFC pr				
	Revision	Date	Name			FGEEBSSFCPR-0027.00		FGEFBSSFCpr-00034.00		Sheet 1	26
										USE	

1	2	3	4	5	6	7	8

1.1	Silencer
1.2	Silencer
2	Air filter
3	Blower block
3.1	Drive motor
3.2	Pt100 temperature sensor - Drive motor
3.4	Oil level monitoring - Drive side
3.5	Oil level monitoring - Gear-end
3.6	Pt100 temperature sensor - Inlet temperature [t_1]
3.7	Pt100 temperature sensor - Airend discharge temperature [t_2]
3.8	Pt100 temperature sensor - Oil temperature [t_3]
3.9	Solenoid valve
3.10	Filter
3.11	Pump
3.11.1	Drive motor
4	Safety relief valve
8.1	Pressure transducer
8.2	Pressure transducer
10	Non-return flap
11.1	Compensator
11.2	Compensator
12	Sound enclosure
12.1	Fan motor
12.2	Thermostat - Sound enclosure temperature [t_S]

Option

G1	Non-return flap
H11	Piped inlet

c				Date	18.03.2022	KAESER KOMPRESSOREN	P&I diagram				
b				Drawn	Plau		Screw blower				
a				Released	Mlynek		FBS SFC pr				
	Revision	Date	Name			FGEEBSSFCPR-0027.00			FGEFBSSFCpr-00034.00	Sheet 2	
										27	USE

Sigma Control 2™ Control – Screw Blower

Kaeser's Integrated Control includes the following:

- Industrial PC with powerful processing software for the control, regulation, and monitoring of the blower package, allowing the display and modification of machine settings and external communication.
- Local control interface with backlit display and touch keys.
- Unique Radio Frequency Identification (RFID) Technology for secure logins.
- Remote visualization of blower controller via supplied Ethernet connection.
- SD card slot for SD/SDHC cards allowing for manual loading of updates and recording of process data with supplied card.
- Real time clock with 10+ year battery life backup.
- Input / output module (IOM) numerous digital / analog inputs and outputs.
- Expansion slot for customer communication interface (Ethernet/IP, Profibus DPVO, Modbus RTU, Devicenet, Modbus TCP-2P, or Profinet IO-2P via optional module).

Specifications:

- Width 7.5" x Height 5.1" x Depth 1.8"
- Number of membrane keys : 13
- Number of LEDs indicators : 9
- Degree of protection, control cabinet exterior : IP 54
- Degree of protection, control cabinet interior : IP 20
- Voltage : 24vdc
- Current : 0.3 amps
- Graphic display :
    - o 255 x 128 pixel
    - o Width 3.2" x Height 1.6"
    - o Maximum number of lines/ characters : 8/30
    - o Lighting : LED backlit

Sigma Control 2™ Control – Screw Blower

Input and Outputs:

- Internally wired digital/analog inputs and outputs that control and/or monitor the following standard and optional items (if supplied);
  - o Main motor
  - o Sound enclosure ventilation fan
  - o Electrical panel enclosure ventilation fan
  - o Emergency stop
  - o Voltage monitoring
  - o Blower discharge temperature
  - o Sound enclosure temperature
  - o Blower inlet temperature
  - o Blower inlet pressure
  - o Blower outlet pressure
  - o Oil temperature
  - o Oil level monitoring
  - o Unloaded electromagnetic startvalve (optional accessory)
  - o Blower speed (optional accessory)
  - o Idling valve (optional accessory)
  - o Aftercooler motor (optional accessory)

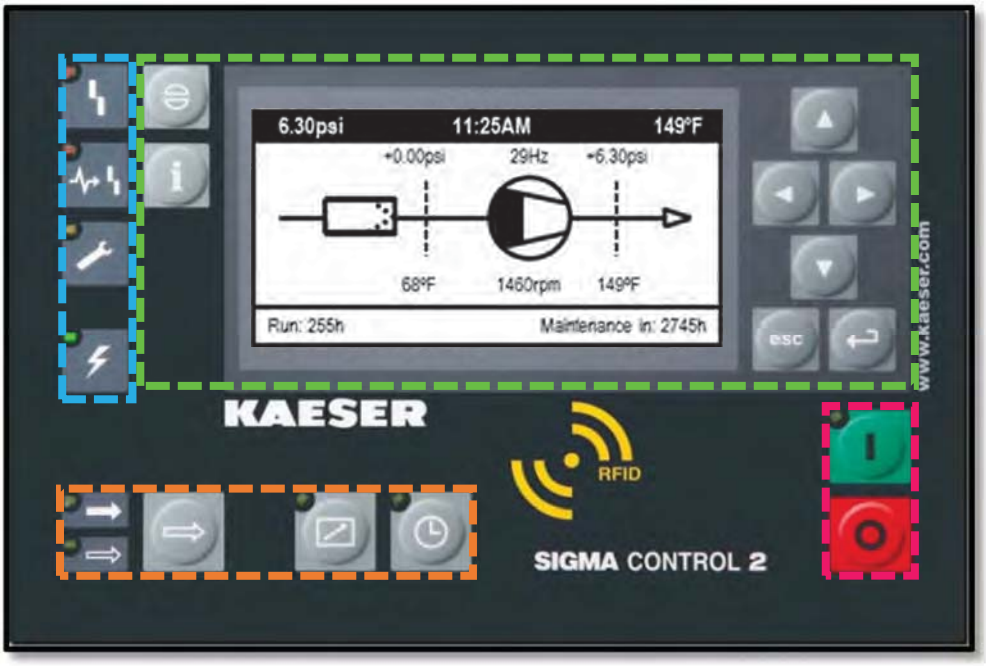
- Externally wired digital/analog inputs and outputs for users use.
  - o Remote on/off
  - o Remote reset of fault message
  - o Remote 4-20mA blower speed signal (OFC supplied packages only)
  - o Remote no external failure
  - o Blower running signal
  - o Blower on signal
  - o Group alarm signal
  - o Group warning signal

Security with RFID

This technology ensures secure log-in for users and service personnel so service work and system changes can be performed only by authorized and qualified personnel.

Sigma Control 2™ Control – Screw Blower

User Interface:



Function keys and indicators

ON key
Turns ON the machine for remote or self-control operation, Green LED indicates machine is on (or ready for on from remote)

OFF key
Turns OFF the machine

Idle Key
Switches the machine from load to idle (and vice versa)

Load/Idle indicator
Green LED indicates whether the machine is loaded (making air) or idling

Remote ON key
Add function. Green LED indicates external control is enabled.

Timer ON/OFF Key
Switches the timer ON and OFF. Green LED indicates the timer mode is active

Alarm Indicator
Red LED indicates the machine has shut down with and alarm

Communication Fault Indicator
Red LED indicates faulty external communication

Maintenance Indicator
Yellow LED indicates maintenance is due

Main Power Indicator
Green LED indicates there is power to the machine (the control cabinet is energized)

Navigation keys

Scroll Keys
Scrolls up and down, line by line. Scrolls right and left

Escape Key
Returns to the next higher menu level

Enter/Return key
Goes to next sub-menu down or accepts inputted value

Acknowledge key
Acknowledges alarms and, when permitted, resets the alarm memory

Information key
Access to additional information

1

The choice is yours

You can select between two Power Modules depending upon your particular requirements.

Standard braking response with braking chopper

PM240/PM240-2 Power Modules

The PM240/PM240-2 Power Modules are ideal for standard applications in general machinery construction.

Innovative braking response with energy recovery

PM250 Power Modules

The PM250 Power Module is ideal for applications requiring energy recovery.

2

Select your Control Unit

CU230P-2 Control Unit

The CU230P-2 Control Unit is specifically designed for pump, fan and compressor applications

CU240B-2/CU240E-2 Control Unit

The CU240B-2/CU240E-2 are suitable for a multitude of applications in general machinery construction (e.g. mixers, agitators)

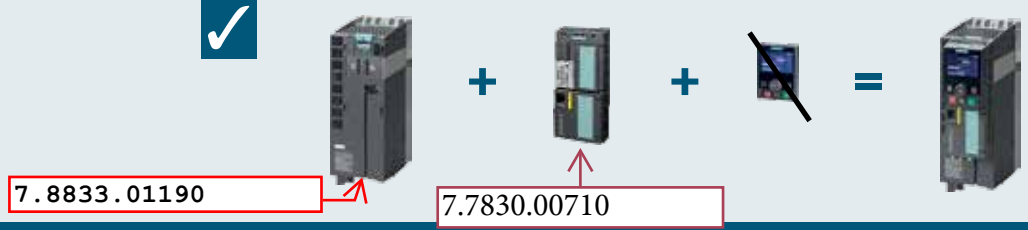
CU250S-2 Control Unit

The CU250S-2 is suitable for high-quality applications (e.g. extruders and centrifuges)

3

Select the optional components

Additional components are available depending upon your particular requirements, for example, an operator panel (IOP or BOP-2) or a blanking cover.



Your SINAMICS G120 drive has now been configured

Detailed information on products and options is provided in the current Catalog D 31 in Chapter "SINAMICS G120 standard inverters" or in the Siemens Industry Mall.

SIEMENS

Datenblatt für SINAMICS Power Module PM240-2

Data sheet for SINAMICS Power Module PM240-2

Bestelldaten
Ordering data

6SL3210-1PE31-8AL0

No image available for this configuration.

Abbildung ähnlich / *Figure similar*

Kunden-Auftrags-Nr. / *Client order no.*:
Siemens-Auftrags-Nr. / *Order no.*:
Angebots-Nr. / *Offer no.*:
Bemerkung / *Remarks*:

Item-Nr. / *Item no.*:
Komm.-Nr. / *Consignment no.*:
Projekt / *Project*:

Bemessungsdaten / *Rated data*

Eingang / *Input*

Phasenzahl *Number of phases*	3 AC
Netzspannung *Line voltage*	380 ... 480 V ±10 %
Netzfrequenz *Line frequency*	47 ... 63 Hz
Bemessungsstrom (LO) *Rated current (LO)*	172,00 A
Bemessungsstrom (HO) *Rated current (HO)*	154,00 A

Ausgang / *Output*

Phasenzahl *Number of phases*	3 AC
Bemessungsspannung *Rated voltage*	400 V
Bemessungsleistung (LO) *Rated power (LO)*	90,00 kW / 125,00 hp
Bemessungsleistung (HO) *Rated power (HO)*	75,00 kW / 100,00 hp
Bemessungsstrom (LO) *Rated current (LO)*	178,00 A
Bemessungsstrom (HO) *Rated current (HO)*	145,00 A
Ausgangsstrom, max. *Max. output current*	290,00 A
Pulsfrequenz *Pulse frequency*	4 kHz
Ausgangsfrequenz bei Vector-Regelung *Output frequency for vector control*	0 ... 200 Hz
Ausgangsfrequenz bei U/f-Regelung *Output frequency for V/f control*	0 ... 550 Hz

Allgemeine tech. Daten / *General tech. specifications*

Leistungsfaktor λ *Power factor λ*	0,95
Verschiebungswinkel cos φ *Offset factor cos φ*	0,99
Wirkungsgrad η *Efficiency η*	0,98
Schalldruckpegel LpA (1m) *Sound pressure level (1m)*	68 dB
Verlustleistung *Power loss*	2,33 kW

Umgebungsbedingungen / *Ambient conditions*

Kühlung *Cooling*	Interne Luftkühlung *Internal air cooling*
Kühlluftbedarf *Cooling air requirement*	0,153 m³/s
Aufstellhöhe *Installation altitude*	1000 m

Umgebungstemperatur / *Ambient temperature*

Betrieb LO *Operation LO*	-20 ... 40 °C (-4 ... 104 °F)
Betrieb HO *Operation HO*	-20 ... 50 °C (-4 ... 122 °F)
Transport *Transport*	-40 ... 70 °C (-40 ... 158 °F)
Lagerung *Storage*	-40 ... 70 °C (-40 ... 158 °F)

Relative Luftfeuchte / *Relative humidity*

Betrieb, max. *Max. operation*	95 % RH, Betauung nicht zulässig *95 % RH, condensation not permitted*

Überlastfähigkeit / *Overload capability*

Low Overload (LO)

1,1 × Bemessungsausgangsstrom (d. h. 110 % Überlast) während 57 s bei einer Zykluszeit von 300 s 1,5 × Bemessungsausgangsstrom (d. h. 150 % Überlast) während 3 s bei einer Zykluszeit von 300 s
1.1 x rated output current (i.e. 110 % overload) for 57 s with a cycle time of 300 s 1.5 × rated output current (i.e. 150 % overload) for 3 s with a cycle time of 300 s

High Overload (HO)

1,5 × Bemessungsausgangsstrom (d. h. 150 % Überlast) während 57 s bei einer Zykluszeit von 300 s 2 × Bemessungsausgangsstrom (d. h. 200 % Überlast) während 3 s bei einer Zykluszeit von 300 s
1.5 × output current rating (i.e., 150 % overload) for 57 s with a cycle time of 300 s 2 × output current rating (i.e., 200 % overload) for 3 s with a cycle time of 300 s

Kaeser P/N: 7.8833.01190

SIEMENS

Datenblatt für SINAMICS Power Module PM240-2

Data sheet for SINAMICS Power Module PM240-2

Bestelldaten
Ordering data

6SL3210-1PE31-8AL0

No image available for this configuration.

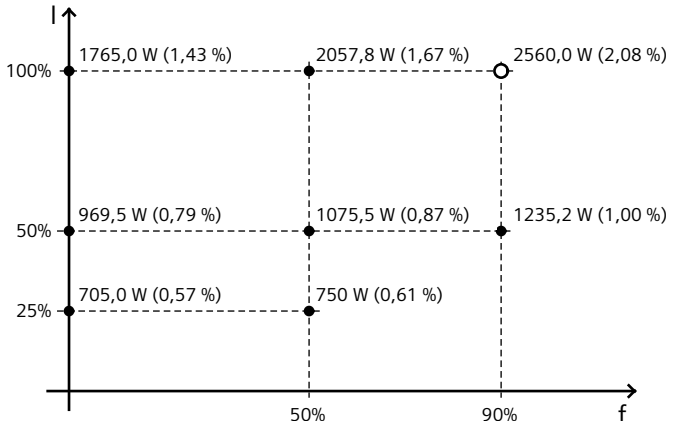
Abbildung ähnlich / *Figure similar*

Mechanische Daten / *Mechanical data*

Schutzart *Degree of protection*	IP20 *IP20*
Baugröße *Size*	FSF
Nettogewicht *Net weight*	63,00 kg
Breite *Width*	305,0 mm
Höhe *Height*	708,0 mm
Tiefe *Depth*	357,0 mm

Umrichterverluste nach EN 50598-2* / *Converter losses to EN 50598-2**

Wirkungsgradklasse *Efficiency class*	IE2
Vergleich zum Referenzumrichter (90% / 100%) *Comparison with the reference converter (90% / 100%)*	-0,51 %



Die Prozentwerte geben die Verluste in Bezug auf die Bemessungsscheinleistung des Umrichters an.
The percentage values show the losses in relation to the rated apparent power of the converter.

Das Diagramm zeigt die Verluste für die Punkte (gemäß Norm EN50598) des relativen Drehmoment bildenden Stromes (I) über der relativen Motorständerfrequenz(f). Die Werte gelten für die Grundausführung des Umrichters ohne Optionen/Komponenten.
The diagram shows the losses for the points (as per standard EN 50598) of the relative torque generating current (I) over the relative motor stator frequency(f). The values are valid for the basic version of the converter without options/components.

*berechnete Werte; wurden gemäß Norm um 10% erhöht
**calculated values; increased by 10% according to the standard*

Anschlüsse / *Connections*

Netzseitig / *Line side*

Ausführung *Version*	Schraubbolzen M10 *M10 bolt*
Anschlussquerschnitt *Conductor cross-section*	35,00 ... 120,00 mm²

Motorseitig / *Motor end*

Ausführung *Version*	Schraubbolzen M10 *M10 bolt*
Anschlussquerschnitt *Conductor cross-section*	35,00 ... 120,00 mm²

Zwischenkreis (für Bremswiderstand) / *DC link (for braking resistor)*

Ausführung *Version*	Schraubklemmen *Screw-type terminals*
Anschlussquerschnitt *Conductor cross-section*	25,00 ... 70,00 mm²
PE-Anschluss *PE connection*	Schraubbolzen M10 *M10 screw studs*

Motorleitungslänge, max. / *Max. motor cable length*

Geschirmt *Shielded*	300 m
Ungeschirmt *Unshielded*	450 m

Normen / *Standards*

Normen-Konformität *Compliance with standards*	UL, cUL, CE, C-Tick (RCM), SEMI F47 *UL, cUL, CE, C-Tick (RCM), SEMI F47*
CE-Kennzeichen *CE marking*	Niederspannungs-Richtlinie 2006/95/EG *Low-voltage directive 2006/95/EC*

Kaeser P/N: 7.8833.01190

SIEMENS

Datenblatt für SINAMICS Control Unit CU240E-2

Data sheet for SINAMICS Control Unit CU240E-2

Bestelldaten
Ordering data

6SL3244-0BB12-1BA1

Kunden-Auftrags-Nr. / *Client order no.*:
Siemens-Auftrags-Nr. / *Order no.*:
Angebots-Nr. / *Offer no.*:
Bemerkung / *Remarks*:

Item-Nr. / *Item no.*:
Komm.-Nr. / *Consignment no.*:
Projekt / *Project*:

Elektrische Daten / *Electrical data*

Betriebsspannung über / *Operating voltage via*

Das Powermodule *The Power Module*	DC 24 V
Externe Stromversorgung *External power supply*	DC 20 ... 29 V
Stromaufnahme, max. *Max. power consumption*	0,50 A
Verlustleistung *Power loss*	5,50 W

Ein/ Ausgänge / *Inputs/ outputs*

Digitaleingänge-Standard / *Standard digital inputs*

Anzahl *Number*	6
Schaltpegel: 0→1 *Switching level: 0→1*	11 V
Schaltpegel: 1→0 *Switching level: 1→0*	5 V

Digitaleingänge-Fail Safe / *Fail-safe digital inputs*

Anzahl *Number*	1 (Nutzung von 2 × DI Standard) *1 (Use of 2 × DI Standard)*

Digitalausgänge / *Digital outputs*

Anzahl als Relais-Wechsler *Number as relay changeover contact*	2

Analog/ Digitaleingänge / *Analog/ digital inputs*

Anzahl *Number*	2 (Differenz-Eingang) *2 (Differential input)*

Analogausgänge / *Analog outputs*

Anzahl *Number*	2 (potenzialbezogener Ausgang) *2 (Non-isolated output)*

Anschlüsse / *Connections*

Signalkabel / *Signal cable*

Anschlussquerschnitt *Conductor cross-section*	0,05 ... 1,50 mm² (30 ... 16 AWG)

Umgebungsbedingungen / *Ambient conditions*

Umgebungstemperatur / *Ambient temperature*

Betrieb *Operation*	-10 ... 55 °C (14 ... 131 °F)
Lagerung *Storage*	-40 ... 70 °C (-40 ... 158 °F)

Relative Luftfeuchte / *Relative humidity*

Betrieb, max. *Max. operation*	95 %

Kommunikation / *Communication*

Kommunikation *Communication*	RS485 *RS485*

Regelungsverfahren / *Closed-loop control techniques*

U/f linear / quadratisch / parametrierbar *V/f linear / square-law / parameterizable*	Ja *Yes*
U/f mit Flussstromregelung (FCC) *V/f with flux current control (FCC)*	Ja *Yes*
U/f ECO linear / quadratisch *V/f ECO linear / square-law*	Ja *Yes*
Vector-Regelung, geberlos *Sensorless vector control*	Ja *Yes*
Vector-Regelung, mit Geber *Vector control, with sensor*	Nein *No*
Drehmomentenregelung, geberlos *Encoderless torque control*	Ja *Yes*
Drehmomentenregelung, mit Geber *Torque control, with encoder*	Nein *No*

Normen / *Standards*

Normen-Konformität *Compliance with standards*	UL, cUL, CE, C-Tick *UL, cUL, CE, C-Tick*
CE-Kennzeichen *CE marking*	
Niederspannungs-Richtlinie 2006/95/EG *Low-voltage directive 2006/95/EC*	

Mechanische Daten / *Mechanical data*

Schutzart *Degree of protection*	IP20 *IP20*
Nettogewicht *Net weight*	0,49 kg
Breite *Width*	73,0 mm
Höhe *Height*	199,0 mm
Tiefe *Depth*	46,0 mm

Kaeser P/N: 7.7830.00710

SIEMENS

Datenblatt für Drehstrom-Käfigläufermotoren
Data sheet for three-phase Squirrel-Cage-Motors

Kaeser-Teilenummer / *Kaeser part-no.* :	895696.0
Siemens-Code:	1FP3105-2BF70-0DA0
Motor-MLFB:	1FP1514-2BF79-0JP6-Z
Optionen / *options*:	D39+D47+L01+L08+L20+L22+L23+R11+Y56+Y58+Y84+Y99
Motortyp / *Motor type:*	1TV4227F
Letzter Bearbeitungsstand / *Last date of change*:	2021-01-04

U	Δ / Y	f	P	P	SF	I	n	M	NOM. EFF at ... load [%]			Power factor at ... load			I_A/I_N	M_A/M_N	M_K/M_N	IE-CL
[V]		[Hz]	[kW]	[hp]		[A]	[1/min]	[Nm]	4/4	3/4	2/4	4/4	3/4	2/4	II/IN	TI/TN	TB/TN	
100	D	30	17,2	-	1	144,00	900	182	-	-	-	0,73	-	-	-	-	-	-
380	D	116	75	-	1	163,00	3480	205	95,60	-	-	0,73	-	-	-	-	-	IES2
380	D	133	75	-	1	163,00	4000	178	-	-	-	0,73	-	-	-	-	-	-
440	D	133	84	-	1	157,00	4000	201	-	-	-	0,73	-	-	-	-	-	-

IMB35 (FF500)	395 kg	FS 225M	IP 55	IEC/EN 60034

IEC+UL+CSA+EAC

Mechanische Daten / Mechanical data

Schalldruckpegel (LpfA) 50Hz/60Hz (Last) *Sound pressure level 50Hz/60Hz (load)*	dB(A)	dB(A)		
Trägheitsmoment *Moment of inertia*	0,47032 kgm²			
Lager AS | BS *Bearing DE | NDE*	6313-C4	6213-C4		
Nachschmierfrist/-menge AS/BS *Relubrication interval/quantity DE / NDE*	3000 h h	20g g	20g g	
Schmiermittel *Lubricants*	Esso Unirex N3			
Nachschmiereinrichtung *Regreasing device*	Kegel AM10x1DIN71412 A			
Lagerlebenszeit *Bearing Life time*	20000h h			
Art der Lagerung *Type of bearing*	-			
Kondenswasserlöcher *Condensate drainage holes*	Ja / Yes			
Äußere Erdungsklemme *External earthing terminal*	Ja / Yes			
Vibrationsklasse *Vibration class*	A	**Kühlart** *Method of cooling*	IC 411	
Isolation *Insulation*	Klasse F	155 (F)	nach nach	130 (B)
Betriebsart *Duty type*	S9			
Drehrichtung *Direction of rotation*	Rechts / Right			
Gehäusematerial *Frame material*	Grauguss			
Daten Stillstandsheizung *Data of anti condensation heating*	Nein			

Anstrich *Coating*	Normalanstrich C2 / Standard paint finish C2
Farbe *Color*	RAL9007
Motorschutz *Motor Protection*	1 Widerstandsthermometer PT100 - 2 Leiterschaltung (2 Klemmen)

Umgebungsbedingungen / Environmental conditions

Umgebungstemperatur *Ambient temperature*	-20 °C - 45 °C
Höhe über Meeresspiegel *Altitude above sea level*	1000 m

Anschlusskasten / Terminal box

Klemmenkastenlage *Terminal box position*	seitlich links
Klemmenkastenmaterial *Material of terminal box*	Grauguss
Klemmenkastentyp *Type of terminal box*	TB1L01
Gewinde Kontaktschraube *Contact screw thread*	6x -
Max. Leiterquerschnitt *Max. cross-sectional area*	50 mm²
Kabeldurchmesser von ... bis ... *Cable diameter from ... to ...*	mm - mm
Kabeleinführung *Cable entry*	2xM63x1,5 / 1xM12x1,5
Kabelverschraubung *Cable gland*	3x Verschr.

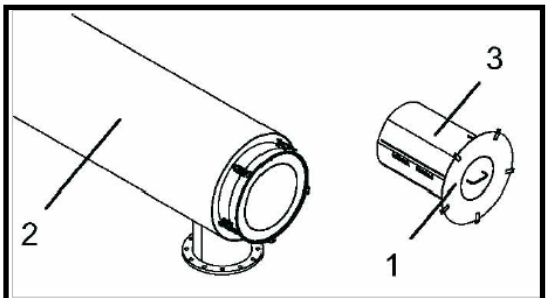
Hinweise / notes

-

Sonderausführung / Special design

L01	**Wuchten ohne Passfeder**	**Balancing without key**
L08	**Rundlauf des Wellenendes, Koaxialität und Planlauf DIN 42955 R**	**Radial eccentricity of the shaft end, concentricity and axial eccentricity DIN 42955 R**
L20	**Festlager AS**	**Locating bearing DE**
L22	**Lagerung für erhöhte Querkräfte**	**Bearing for increased cantilever forces**
L23	**Flachschmiernippel**	**Flat type lubricating nipple**
R11	**Anschlusskasten um 90° gedreht, Einführung von BS**	**Terminal box rotated through 90°, cable entry from NDE**
Y56	**Sonder-RAL-Farbton (3)**	**Special RAL colours (3)**
Y58	**Anormales zylindrisches Wellenende AS**	**Non-standard cylindrical shaft extension DE**

FBS Inlet Air Silencer/Filter Assembly

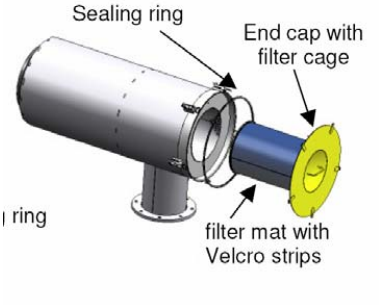


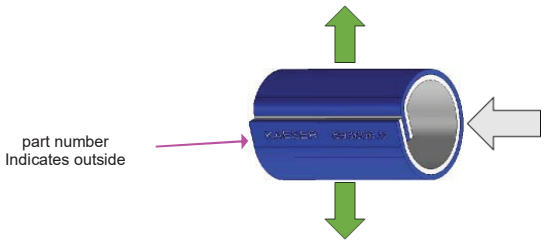
Changing the air filter

1 Cover
2 Inlet silencer
3 Air filter

Model	Connection Size	Filter Part-No.	Sealing Ring Part-No.	No. of Filter Assemblies
FB720S	8"	895836.0	894645.00010	1

Air Inlet Filter Media



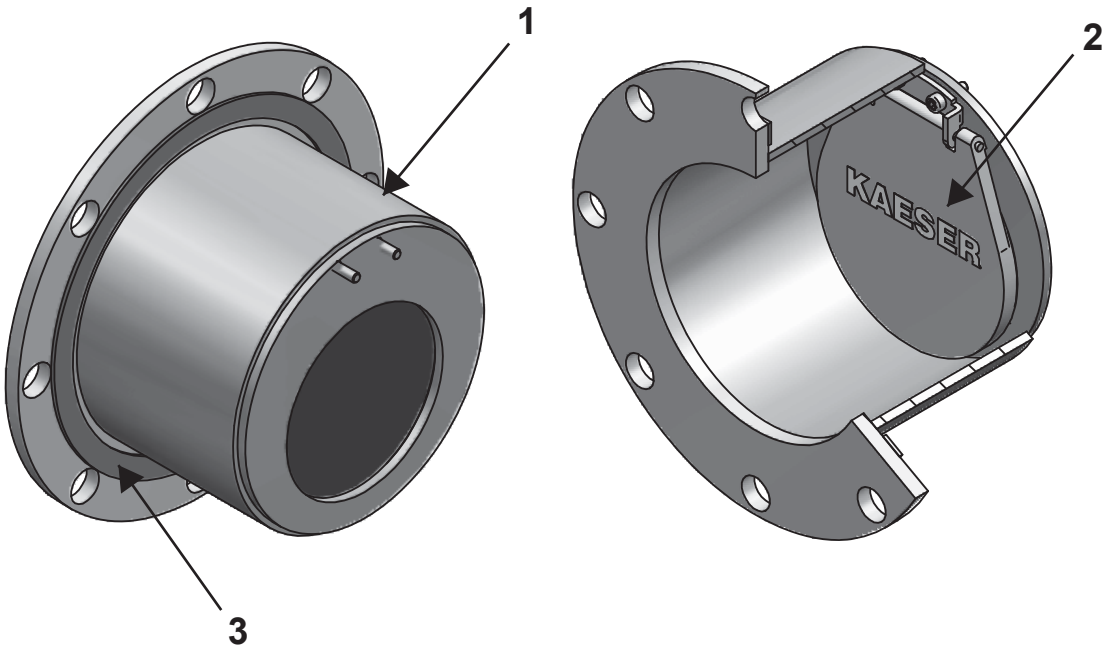


Particle Retention

Particle Size	Efficiency
0.5	5%
1.0	20%
1.5	30%
2.0	40%
2.5	50%
3.0	60%
4.0	85%
5.0	>99%

- The filters are in the form of mats to be wound around the inlet port and retained by means of hook and loop strips.
- Flow direction to the blower is important during installation; if it is done wrong, then the filter sheet material will be sucked away into the blower. Use appropriate installation per model.

Check Valve – Pressure

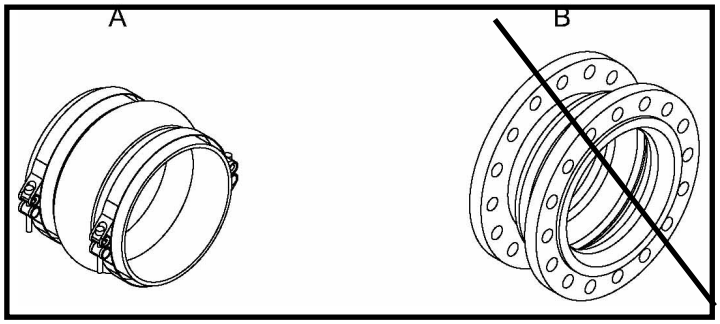


Item #	Description	Material
1	Check valve housing	Steel
2	Check valve flap assembly	Silicone/ Steel
3	Gasket	Hi-temp gasket

Blower Package	Check Flap Service Kit P/N	Maximum Pressure	Maximum Temperature
FB720Sx	403931.0	22 psig	440º F

This check valve is NOT suitable for water service; it is engineered for air service only.

8.2.3.2 Slip-on Expansion Joint- inlet



Compensator

A Compensator, at intake end (in Option H11)

~~B Compensator, at pressure end~~

Part Number	Pipe Size (Inches)	Actual I.D.* (Inches)	Clamp Part Number	Clamp Quantity
895740.0	8	8.625	890609.0	2

Materials:

Sleeve..... Silicone with polyester reinforcement

Clamps ..... Stainless Steel 1" wide screw type

Specifications:

Compensator Length ..... 7.9"
Compensator Wall Thickness..... .28"
Compensator Inner Diameter..... 8.625" *
Working Pressure ..... 21.7 PSI
Service Temperature Min..... -58 ºF
Service Temperature Max..... 356 ºF **

* Compensator provided to accept standard 8" pipe

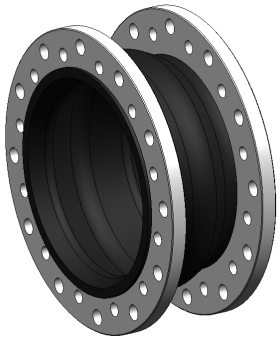
** Please contact the factory for applications requiring higher temperature elastomers.

Note: All piping must be self-supporting, expansion joint should not see any load.

FBS Discharge Expansion Joints

Flexible elastomeric compensator/flex connector to facilitate connection to discharge pipe header shall be provided.

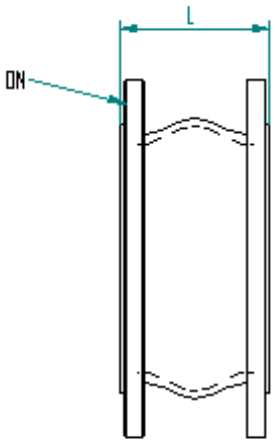
Flange shall have both DIN and ANSI bolt patterns.



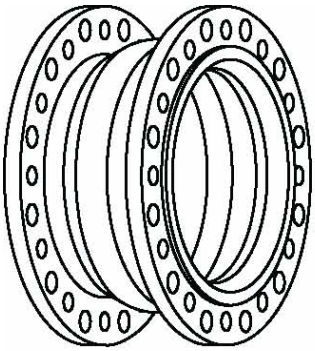
- This drawing is not to scale.

ANSI 150#	DN PN10	Part no.	L		Variability (+/-)	
			Inch	mm	Inch	mm
8”	DN 200	895253.0	6	152	½ - 5/8	12/19

Side View



Isometric View



- This drawing is not to scale.

Construction Details:

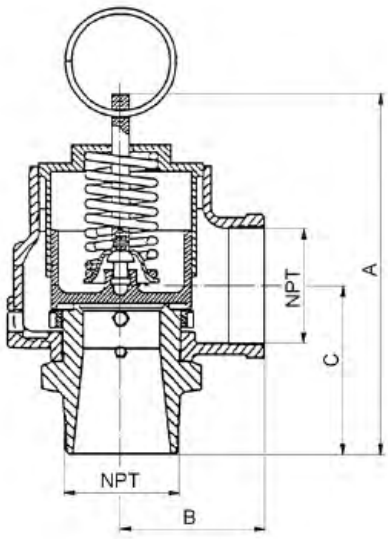
-EPDM elastomers rated for 300 F at 20 psi.
-Carbon steel flanges are full faced and flat, zinc plated corrosion resistance, and designed to ANSI B16.5, Class 150lbs. Or AWWA C207, Table 3, Class E.
-The following parts not included and required for installation:

1. **Flange Bolting**
2. **Gasket**
3. **Sealants and Consumables**
4. **Mating Flange***

Size and number of Mating Flange Bolts required:

- 8” (3/4” x 8)

Pressure Relief Valve



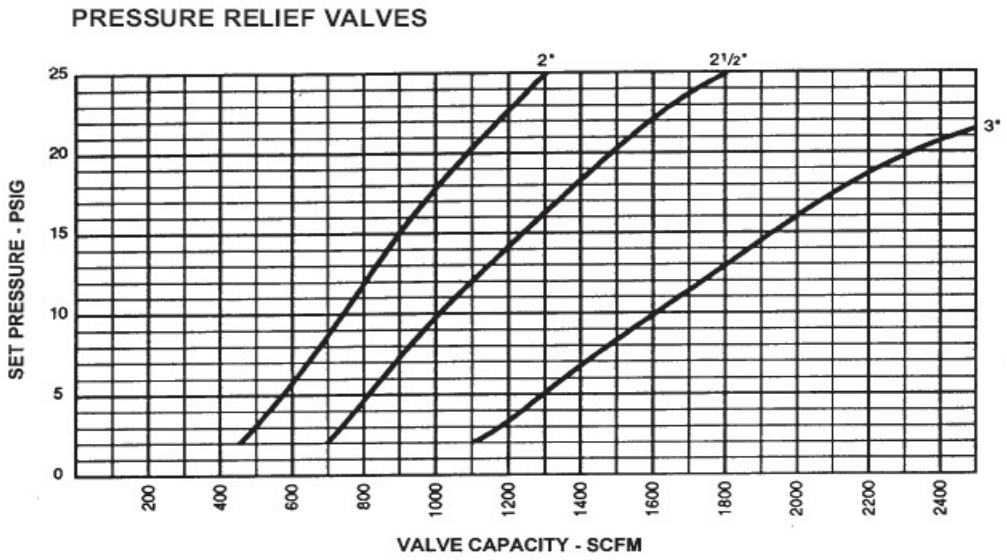
Qty x2 to be supplied per blower package

Type	Thread Connection NPTM	A (in)	B (in)	C (in)
337-K	3" x 3"	9"	4"	4-1/4"

General Information:
The sole purpose of the relif valve is the protection of the rotary blower package against excess pressure. It is not to be used as a regulating device.

The relief valve must be installed so that the spring and valve seat are veritical. The air from the outlet port should be directed downwards by use of an elbow or piping.

8.1.3.3 CompaK Plus Pressure Relief Valve



9.2.1 Spare Parts List

	Air Inlet Filter	Blower Oil	Motor Grease	V-Belt Set	Check Flap Service Kit	Flex Connector Outlet
Model	Short Term Spare Parts				Long Term Spare Parts	
FB720Sx	895836.0	9.0188.20030 (5 liter pail)	6.3234.0	N/A	403931.0	895253E0

Storage Instructions:
Store parts at temperatures between 60ºF and 80ºF in a dust-free and dry room.
Do not store parts together with chemicals, solvents, fuel lubricates, acids, etc. This is especially true for rubber gaskets and belts.
Keep parts a minimum of 1 yard from heaters and keep protected from light (especially sunlight) and ozone.
Relative humidity should be below 65%.

9.3.4 Lubrication Requirements

TECHNICAL DATA – OMEGA AND OMEGA PLUS BLOWERS
LUBRICATION REQUIREMENTS

OMEGA BLOWER – LUBRICATION REQUIREMENTS

Oil Quantity Required to Fill Blowers to Middle of Sight Glass – U.S. Ounces

	HORIZONTAL CONSTRUCTION/VERTICAL AIR FLOW		
MODEL	**Drive End**	**Gear End**	**Total**
FB720Sx	86.4	73.6	160

Oil Changes	
G-680 Synthetic Oil	Up to 6,000 at least every 2 years

Wiring Diagram

Blower with frequency converter

Siemens Sinamics + Sigma Control 2 (SC2)

~~CBS.2: 10hp-30hp (7,5kW-22kW)~~	~~380V +10/-5% 3ph 60Hz~~
~~DBS.2: 20hp-50hp (15kW-37kW)~~	
~~EBS.2: 30hp-100hp (22kW-75kW)~~	460V ±10% 3ph 60Hz
FBS.2: 60hp-150hp (45kW-110kW)	

Power supply:

WYE system with center point solidly grounded

ATTENTION !!!
The document gives collective information on
power supply voltages and frequencies for all machines.
The voltage and frequency and local conditions under
which any particular machine may be used
are given on the nameplate of the machine
and in the accompanying service manual.

manufacturer: KAESER KOMPRESSOREN SE
Postfach 2143
96410 Coburg

c				Date	30.06.2025 USE	KAESER KOMPRESSOREN	cover page		=	
b				Drawn	M.Zeeh		Blower xFC+SC2		+	44
a				Released	M.Zeeh		CBS.2 / DBS.2 / EBS.2 / FBS.2			page 1
A	Change	Date	Name			SXB.XFC-U3030.03		DXB.XFC-U3032.06		1 Sht.

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page	CBS.2 / DBS.2 / EBS.2 / FBS.2		DXB.XFC-U3032.06	1	
2	list of contents			ZXB.XFC-U3032.06	1	
3	general instructions	instructions + option		UXB.XFC-U3032.06	1	
4	component legend	component legend		UXB.XFC-U3032.06	2	
5	electrical component parts list	Common parts		UXB.XFC-U3032.06	3	
6	electrical component parts list	Common parts		UXB.XFC-U3032.06	4	
7	electrical component parts list	performance-related components		UXB.XFC-U3032.06	5	
8	electrical component parts list	performance-related components		UXB.XFC-U3032.06	6	
9	electrical component parts list	performance-related components		UXB.XFC-U3032.06	7	
10	electrical component parts list	performance-related components		UXB.XFC-U3032.06	8	
11	electrical component parts list	performance-related components		UXB.XFC-U3032.06	9	
12	electrical component parts list	performance-related components		UXB.XFC-U3032.06	10	
13	wiring diagram	input voltage		SXB.XFC-U3032.06	1	
14	wiring diagram	power unit		SXB.XFC-U3032.06	2	
15	wiring diagram	power unit vent		SXB.XFC-U3032.06	3	
16	wiring diagram	power unit vent		SXB.XFC-U3032.06	4	
17	wiring diagram	control voltage		SXB.XFC-U3032.06	5	
18	wiring diagram	control		SXB.XFC-U3032.06	6	
19	wiring diagram	Oil return + SC2 + IOM		SXB.XFC-U3032.06	7	
20	wiring diagram	IOM-configuration		SXB.XFC-U3032.06	8	
21	wiring diagram	digital inputs IOM		SXB.XFC-U3032.06	9	
22	wiring diagram	analog inputs IOM		SXB.XFC-U3032.06	10	
23	wiring diagram	Relay-outputs IOM		SXB.XFC-U3032.06	11	
24	wiring diagram	frequency converter		SXB.XFC-U3032.06	12	
25	wiring diagram	User's controller EMERGENCY STOP		SXB.XFC-U3032.06	13	
26	wiring diagram	Handling terminals		SXB.XFC-U3032.06	14	
27	wiring diagram	Feed line connection		SXB.XFC-U3032.06	15	
28	wiring diagram	Feed line connection		SXB.XFC-U3032.06	16	
29	terminal connection	-X0,-X11,-X12,-X13.1,-X13.2,-X14		KXB.XFC-U3032.06	1	
30	terminal connection	-X15,-X16,-X21,-X22		KXB.XFC-U3032.06	2	
31	terminal connection	-X100		KXB.XFC-U3032.06	3	
32	lay-out	Switchboard 10-50hp / 7,5-37kW		AXB.XFC-U3032.06	1	
33	lay-out	Switchboard 60-150hp / 45-110kW		AXB.XFC-U3032.06	2	

general instructions

ATTENTION !!!
Install supplies, grounding and shock protection
to local safety regulations.
Do not make or break
live plug-in connectors.

control cabinet wiring for non-designated conductors
with multi-standard stranded conductors

primary circuits:	black 2,5mm² H07V-K, 14AWG UL-Style 1015, CSA-TEW
control voltage AC 24/115V:	red 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
control voltage AC 24/115V grounded:	white 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
control voltage DC 24V:	blue 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
control voltage DC 24V grounded:	white/blue 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
external voltage:	orange 1,5mm² H07V-K, 16AWG UL-Style 1015, CSA-TEW
ground conductor:	green/yellow H07V-K, UL-Style 1015, CSA-TEW

type / option

B13 = mode of operation overpressure

~~B14 = mode of operation Vacuum~~

C38 = SIGMA FREQUENCY CONTROL (SFC)

~~C58 = EMERGENCY STOP-switching device~~

~~H30 = High altitude installation > 1.000 m.ü.NN / m.a.s.l~~

1	2	3	4	5	6	7	8

-B1/-B4	pressure transducer (4...20mA)
-B5	differential pressure switch filter clogging
-B24	overload Relay vent motor
-B40/-B43	temperature probe Pt100 Blower
-B55	temperature probe Pt100 oil temperature monitoring
-B60	temperature probe Pt100 blower motor
-B70	thermostat soundproofing casing
-B80/-B81	oil level switch
-1FU	fuse control voltage tapping
-2FU	primary control fuse control transformer
-3FU	secondary control fuse control transformer
-4FU	fuse ventilator soundproofing casing
-8FU	fuse controller ventilator
-10FU	fuse 24V-AC
-12FU	primary fuse transformer ventilator soundproofing casing (FBS.2)
-29FU	fuse phase sequence relay
-F86	Surge protective device (Canada only)
-K10	solenoid valve Oil return
-K20	SIGMA CONTROL 2 (SC2) (MCS)
-K21	SIGMA CONTROL 2 (SC2) (IOM-Modul)
-K29	phase sequence relay
-K50	coupling relay controller ventilator
-K51	coupling relay ventilator
-K55	coupling relay Oil return
-K60	EMERGENCY STOP-switching device (optional)
-M1	blower motor
-M4	ventilator soundproofing casing
-M8	controller ventilator
-M10	vacuum pump Gear housing ventilation
-Q4	contactor ventilator soundproofing casing
-R1	line commutation reactor
-R3.1	ferrit bead power supply
-R3.2	ferrit bead Motor cable
-R11	interference suppression filter
-S1	EMERGENCY STOP pushbutton
-S9	REMOTE reset fault message

-T1	frequency converter
-T11	control transformer 24+115V AC
-T12	transformer 230V AC
-T21	control voltage supply 24V DC
-T45	isolating amplifier
-X0	terminal strip, power supply
-X11	terminal strip, control
-X12	SC2-IOM digital outputs
-X15	SC2-IOM digital inputs
-X16	frequency converter analog signals
-X21	control voltage 24V-DC
-X22	frequency converter 24V-DC
-X100	EMERGENCY STOP (external/customer)
-K20	*Main Control System SC2 MCS*
-X1	Ethernet
-X2	IO-BUS
-X3	RS485-FC (USS-Bus)
-X4	communication module
-X5	SD card slot
-X6	ground connection
-K21	*IO-Modul SC2 IOM-1*
	inside
-X1	*IO-Bus input*
-X2	*IO-Bus output*
-X3	digital inputs
-X4	power supply unit and Transistor outputs
-X5,-X9	Relay outputs
-X6	analog input 0-20mA
-X7	analog input Pt100
-X8	digital inputs
	external
-X11...-X13	analog inputs 0-20mA
-X14...-X17	analog inputs Pt100
-X18...-X29	digital inputs
-X30...-X32	digital outputs

c				Date	30.06.2025	KAESER KOMPRESSOREN	component legend		=	
b				Drawn	M.Zeeh		Blower xFC+SC2		+	47
a				Released	M.Zeeh		component legend	UXB.XFC-U3032.06	page	2
C	Change	Date	Name							10 Sht.

model	Common parts CBS.2 + DBS.2 + EBS.2 10-100hp / 7,5-75 kW	Common parts FBS.2 60-150hp / 45-110kW
machine power supply	380 V / 460 V - 60 Hz	380V / 460V - 60Hz
pressure transducer -B1 Huba Control	894786.0 0.-1200mbar	894786.0 0.-1200mbar
pressure transducer -B4 Huba Control	8947870 0.1200mbar	894787.0 0.1200mbar
differential pressure switch -B5 Dungs	893307.00010 setting: 14,1 in.W.C.	893307.00010 setting: 14,1 in.W.C.
temperature probe -B40/-B43	895251.10010	895251.10010
oil temperature (C39) -B55 Wika	895603.00100 Pt100	895603.00100 Pt100
thermostat -B70 soundproofing casing . Jumo	894861.11000 heatTHERM-R-2 30-80°C setting: 60°C	894861.11000 heatTHERM-R-2 30-80°C setting: 60°C
oil level switch (C5) -B80/-B81 Elobau	894631.0	894631.0
fuse -1FU Gould	(3x) - 7.3161.00190 ATQR 8 A - 600 V - class CC	(3x) - 7.3161.00190 ATQR 8A - 600V - class CC
fuse -2FU Gould	(2x) - 7.3317.1 ATQR 3 A - 600 V - class CC	(2x) - 7.3317.1 ATQR 3A - 600V - class CC
fuse -3FU Gould	(1x) - 7.3161.00160 ATQR 5 A - 600 V - class CC	(1x) - 7.3161.00160 ATQR 5A - 600V - class CC
fuse -8FU Gould	(1x) - 7.3304.00010 ATDR 2 A - 600 V - class CC	(1x) - 7.3304.00010 ATDR 2A - 600V - class CC
fuse -10FU	895637.0 5x20 0,315 A-T 250 VAC	895637.0 5x20 0,315A-T 250VAC
fuse -29FU Gould	(3x) - 7.3304.00010 ATDR 2 A - 600 V - class CC	(3x) - 7.3304.00010 ATDR 2 A - 600 V - class CC
fuse socket -1FU/-29FU -2FU -3FU/-8FU Wöhner	3-pole (2x) - 7.3320.00060 2-pole (1x) - 7.3320.00070 1-pole (2x) - 7.3320.00050 class CC - Ambus Easy Switch	3-pole (2x) - 7.3320.00060 2-pole (1x) - 7.3320.00070 1-pole (2x) - 7.3320.00050 class CC - Ambus Easy Switch
solenoid valve -K10 bürkert	895601.0 24V-DC 8W	895601.0 24V-DC 8W
Blower control -K20 Prodrive	7.7601.0 SC2MCS	7.7601.0 SC2MCS
Blower control -K21 Prodrive	7.7602.1 SC2IOM-1	7.7602.1 SC2IOM-1
phase sequence relay -K29 Siemens	7.7830.00610 3UG4615-2CR20	7.7830.00610 3UG4615-2CR20
coupling relay -K50 Wieland	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F
coupling relay -K51 Wieland	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F
coupling relay -K55 Siemens	7.8237.00340 3RH2122-2JB40 DC 17-30 V AC-15: 240 V/10 A	7.8237.00340 3RH2122-2JB40 DC 17-30V AC-15: 240V/10A

Fortsetzung: nächstes Blatt

UXB.XFC-U3032.06

electrical component parts list
Blower xFC+SC2
Common parts

KAESER KOMPRESSOREN

	Date	Drawn	Released	Name	Date
c	30.06.2025	M.Zeeh	M.Zeeh		
b					
a					
C	Change				

model	Common parts CBS.2 + DBS.2 + EBS.2 10-100hp / 7,5-75 kW	Common parts FBS.2 60-150hp / 45-110kW
machine power supply	380 V / 460 V - 60 Hz	380V / 460V - 60Hz
EMERGENCY STOP switching device (optional) -K60 Pilz	7.1972.00040 PNOZ X2.8P C 24-240 VAC/DC	7.1972.00040 PNOZ X2.8P C 24-240VAC/DC
vacuum pump -M10 Schwarzer	895612.00100 24V-AC 60 Hz, 4W	895612.00100 24V-AC 60Hz 4W
contactor -Q4 Siemens interference suppressor . Siemens	7.8740.00310 3RT2016-1AK61 7.8740.05130 3RT2916-1CC00	--- --- --- ---
EMERGENCY STOP pushbutton -S1 Siemens	7.3140.05540 7.3140.05550 7.3140.05920 7.3140.05910	7.3140.05540 7.3140.05550 7.3140.05920 7.3140.05910
control transformer -T11 Block	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V	7.2238.10090 USTE630 - 630VA 208-600V/2x115V+24V
power supply -T21 Prodrive	7.7605P0 PSDC24/2.5 100-240 V-AC/24 V-DC 2,5 A	7.7605P0 PSDC24/2.5 100-240V-AC/24V-DC 2,5A
isolating amplifier -T45 Phoenix	7.2892.00110 MCR-2-I-I-PT	7.2892.00110 MCR-2-I-I-PT
control line terminal -X. 11/12/15/16/21/22/100 Handling	895635.00110 Wieland WTP fig. 1, Sht. 13	895635.00110 Wieland WTP fig. 1, Sht. 13

= +

UXB.XFC-U3032.06

electrical component parts list
Blower xFC+SC2
Common parts

KAESER KOMPRESSOREN

	Date	Name
c		
b		
a		
C Change	Date	Name
Drawn	30.06.2025	M.Zeeh
Released		M.Zeeh

performance-related components

model		60 hp FBS.2 (45 kW)	75 hp FBS.2 (55 kW)	100 hp FBS.2 (75 kW)	125 hp FBS.2 (90 kW)	150 hp FBS.2 (110 kW)
machine power supply		**380 V / 460 V - 60 Hz**	**380 V / 460 V - 60 Hz**	**380 V / 460 V - 60 Hz**	**380 V / 460 V - 60 Hz**	**380 V / 460 V - 60 Hz**
Surge protective device	-F86 Dehn	7.8669.00020 DG MU 3PY 480 3W+ G	7.8669.00020 DG MU 3PY 480 3W+ G	7.8669.00020 DG MU 3PY 480 3W+ G	7.8669.00020 DG MU 3PY 480 3W+ G	7.8669.00020 DG MU 3PY 480 3W+ G
fuse -M4: variant 1	-4FU Gould	7.3317.1 (1x) ATQR 3 A - 600 V class CC	7.3317.1 (1x) ATQR 3 A - 600 V class CC	7.3317.1 (1x) ATQR 3 A - 600 V class CC	7.3317.1 (1x) ATQR 3 A - 600 V class CC	7.3317.1 (1x) ATQR 3 A - 600 V class CC
fuse -M4: variant 1	-12FU Gould	7.3313.1 (2x) ATQR 2,5 A - 600 V cl. CC	7.3313.1 (2x) ATQR 2,5 A - 600 V cl. CC	7.3313.1 (2x) ATQR 2,5 A - 600 V cl. CC	7.3313.1 (2x) ATQR 2,5 A - 600 V cl. CC	7.3313.1 (2x) ATQR 2,5 A - 600 V cl. CC
fuse -M4: variant 2	-4FU Gould	(3x) - 7.3161.00350 ATDR 3 A 600 V class CC	(3x) - 7.3161.00350 ATDR 3 A 600 V class CC	(3x) - 7.3161.00350 ATDR 3 A 600 V class CC	(3x) - 7.3161.00350 ATDR 3 A 600 V class CC	(3x) - 7.3161.00350 ATDR 3 A 600 V class CC
fuse socket	-4FU -12FU Wöhner	1-pole - 7.3320.00050 2-pole - 7.3320.00070 3-pole - 7.3320.00060 class CC - Ambus Easy	1-pole - 7.3320.00050 2-pole - 7.3320.00070 3-pole - 7.3320.00060 class CC - Ambus Easy	1-pole - 7.3320.00050 2-pole - 7.3320.00070 3-pole - 7.3320.00060 class CC - Ambus Easy	1-pole - 7.3320.00050 2-pole - 7.3320.00070 3-pole - 7.3320.00060 class CC - Ambus Easy	1-pole - 7.3320.00050 2-pole - 7.3320.00070 3-pole - 7.3320.00060 class CC - Ambus Easy
coupling relay	-K51 Wieland	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F	7.3149.03660 24DC-1W-250V6A-F
Blower motor	-M1 Siemens	895693.0 380V-Y	895694.0 380V-Y	895696.0 380V-D	895697.0 380V-D	895698.0 380V-D
vent motor soundproofing casing -M4: variant 1	-M4 . . ebm	895849.0 W3G350-ZH05-H1 230 V/60 Hz 500W - 2,3 A	895849.0 W3G350-ZH05-H1 230 V/60 Hz 500W - 2,3 A	895849.0 W3G350-ZH05-H1 230 V/60 Hz 500W - 2,3 A	895849.0 W3G350-ZH05-H1 230 V/60 Hz 500W - 2,3 A	895849.0 W3G350-ZH05-H1 230 V/60 Hz 500W - 2,3 A
vent motor soundproofing casing -M4: variant 2	-M4 . . ebm	895850.0 W3G400-ZN12-W1 380 V - 1150W - 1,90 A 460 V - 1150W - 1,60 A	895850.0 W3G400-ZN12-W1 380 V - 1150W - 1,90 A 460 V - 1150W - 1,60 A	895850.0 W3G400-ZN12-W1 380 V - 1150W - 1,90 A 460 V - 1150W - 1,60 A	895850.0 W3G400-ZN12-W1 380 V - 1150W - 1,90 A 460 V - 1150W - 1,60 A	895850.0 W3G400-ZN12-W1 380 V - 1150W - 1,90 A 460 V - 1150W - 1,60 A
vent motor control cabinet	-M8 . x	7.2751.00360 LV600 (Ruebsamen) 115 V/60 Hz, 1/N/PE 80W 0,70 A	7.2751.00360 LV600 (Ruebsamen) 115 V/60 Hz, 1/N/PE 80W 0,70 A	7.2751.00360 LV600 (Ruebsamen) 115 V/60 Hz, 1/N/PE 80W 0,70 A	895854.0 SK 3244.110 (Rittal) 230V/60 Hz, 1/N/PE 145W 1,25 A	895854.0 SK 3244.110 (Rittal) 230V/60 Hz, 1/N/PE 145W 1,25 A
line commutation reactor	-R1 Siemens	integrated ---	integrated ---	integrated (-T1) ---	integrated ---	integrated (-T1) ---
Tape-wound core	-R3.1 -R3.2 Magnetec	7.8538.00020 (M113) 1x 7.8538.00020 (M113)	7.8538.00020 (M113) 1x 7.8538.00050 (M115)	7.8538.00020 (M113) 1x 7.8538.00050 (M115)	7.8538.00020 (M113) 1x 7.8538.00050 (M115)	7.8538.00020 (M113) 1x 7.8538.00050 (M115)
interference suppression filter	-R11 Siemens	integrated ---	integrated ---	integrated ---	integrated ---	integrated ---
frequency converter control unit	-T1 . Siemens	7.8833.01170 6SL3210-1PE31-1AL0 7.7830.00710 6SL3244-0BB12-1BAx	7.8833.01180 6SL3210-1PE31-5AL0 7.7830.00710 6SL3244-0BB12-1BAx	7.8833.01190 6SL3210-1PE31-8AL0 7.7830.00710 6SL3244-0BB12-1BAx	7.8833.01200 6SL3210-1PE32-1AL0 7.7830.00710 6SL3244-0BB12-1BAx	7.8833.01210 6SL3210-1PE32-5AL0 7.7830.00710 6SL3244-0BB12-1BAx
transformer	-T12 Block	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V	7.2238.10090 USTE630 - 630 VA 208-600 V/2x 115 V+ 24 V
motor cable	-W211 (EMV)	2/0 AWG / 4G70 mm² 600 V - 90°C EMV	3/0 AWG / 4G95 mm² 600 V - 90°C EMV	2x 1 AWG / 4G50 mm² 600 V - 90°C EMV	2x 2/0 AWG / 4G70 mm² 600 V - 90°C EMV	2x 3/0 AWG / 4G95 mm² 600 V - 90°C EMV
connection	-W280.1/.2	1 AWG / 50 mm² 600 V - 90°C	2/0 AWG / 70 mm² 600 V - 90°C	3/0 AWG / 95 mm² 600 V - 90°C	2x 1 AWG / 50 mm² 600 V - 90°C	2x 2/0 AWG / 70 mm² 600 V - 90°C

Fortsetzung: nächstes Blatt

c			Date	30.06.2025
b			Drawn	M.Zeeh
a			Released	M.Zeeh
C Change	Date	Name		

KAESER
KOMPRESSOREN

electrical component parts list
FBS.2 45-110kW (60-150hp)
performance-related components

=
+

UXB.XFC-U3032.06

performance-related components

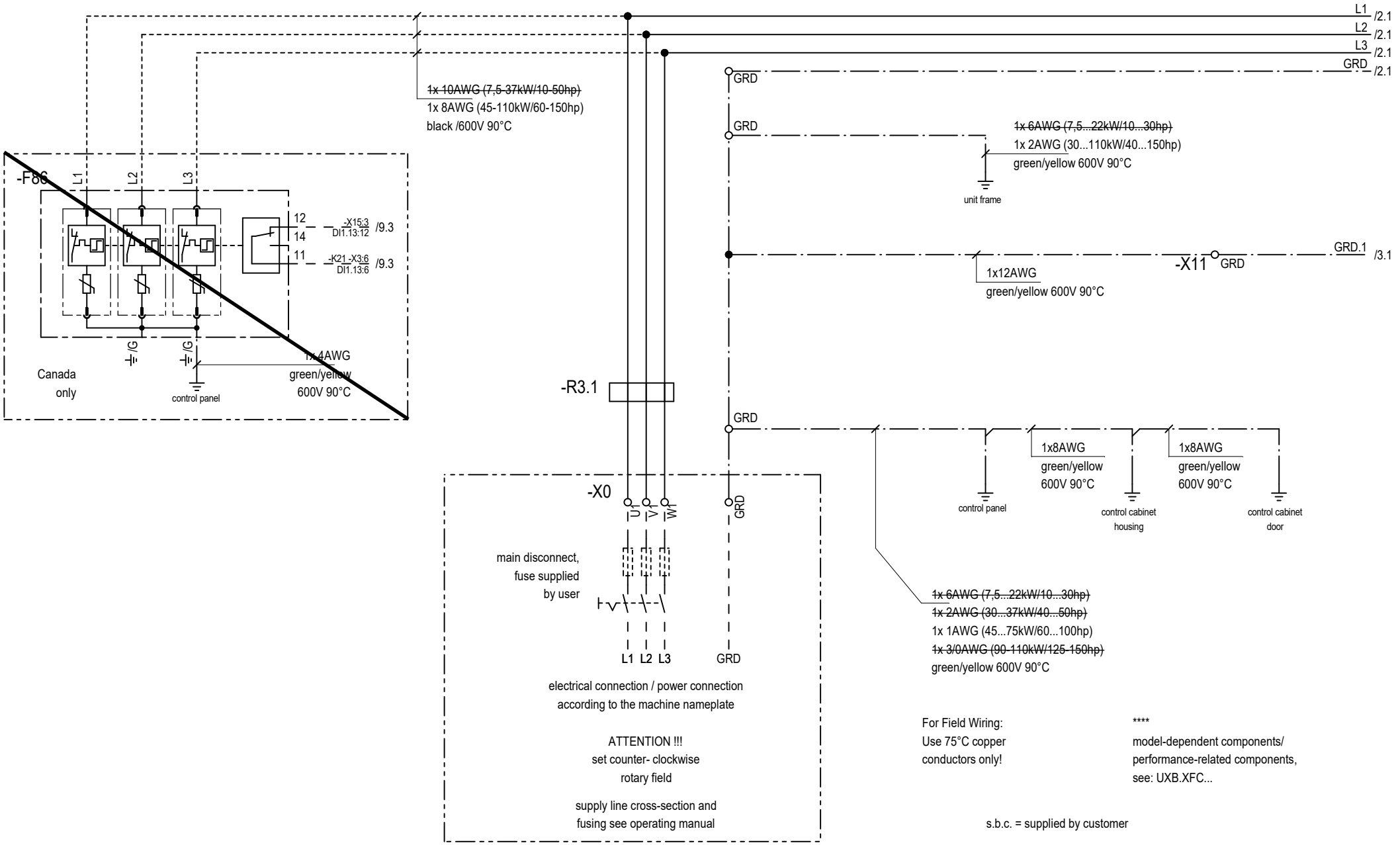
model	60 hp	75 hp	100 hp	125 hp	150 hp
	FBS.2 (45 kW)	FBS.2 (55 kW)	FBS.2 (75 kW)	FBS.2 (90 kW)	FBS.2 (110 kW)
machine power supply	380 V / 460 V - 60 Hz	380 V / 460 V - 60 Hz	380 V / 460 V - 60 Hz	380 V / 460 V - 60 Hz	380 V / 460 V - 60 Hz
supply terminals -X0:	3x 894385.0	3x 894385.0	3x 894385.0	6x 894385.0	6x 894385.0
U1/V1/W1/GRD	3x 894385.00010	3x 894385.00010	3x 894385.00010	3x 894385.00010	3x 894385.00010
	3x 894385.00040	3x 894385.00040	3x 894385.00040	3x 894385.00040	3x 894385.00040
	4-4/0 AWG / 25-95 mm²	4-4/0 AWG / 25-95 mm²	4-4/0 AWG / 25-95 mm²	4-4/0 AWG / 25-95 mm²	4-4/0 AWG / 25-95 mm²
	Wago	Wago	Wago	Wago	Wago
Handling	fig. 3, Sht. 13	fig. 3, Sht. 13	fig. 3, Sht. 13	fig. 3, Sht. 13	fig. 3, Sht. 13
Stripped length X	36 mm	36 mm	36 mm	36 mm	36 mm
supply connection	fig. 1, Sht. 15	fig. 1, Sht. 15	fig. 1, Sht. 15	fig. 2, Sht. 15	fig. 2, Sht. 15

UXB.XFC-U3032.06

electrical component parts list
FBS.2 45-110kW (60-150hp)
performance-related components

KAESER KOMPRESSOREN

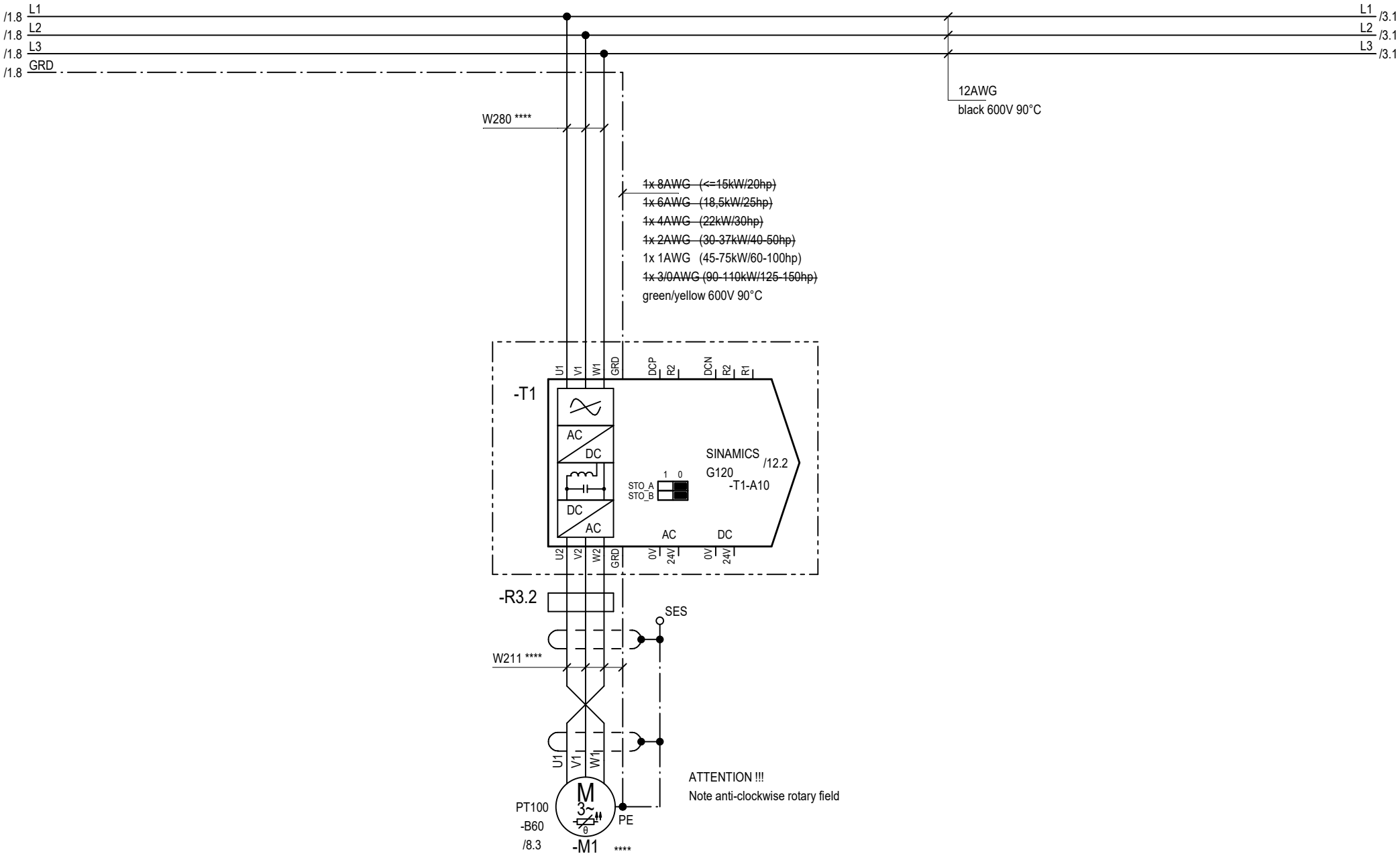
	Date	Name
Drawn	30.06.2025	M.Zeeh
Released		M.Zeeh
C Change	Date	Name
a		
b		
c		



Function:	Surge protective device
Group of function:	input voltage

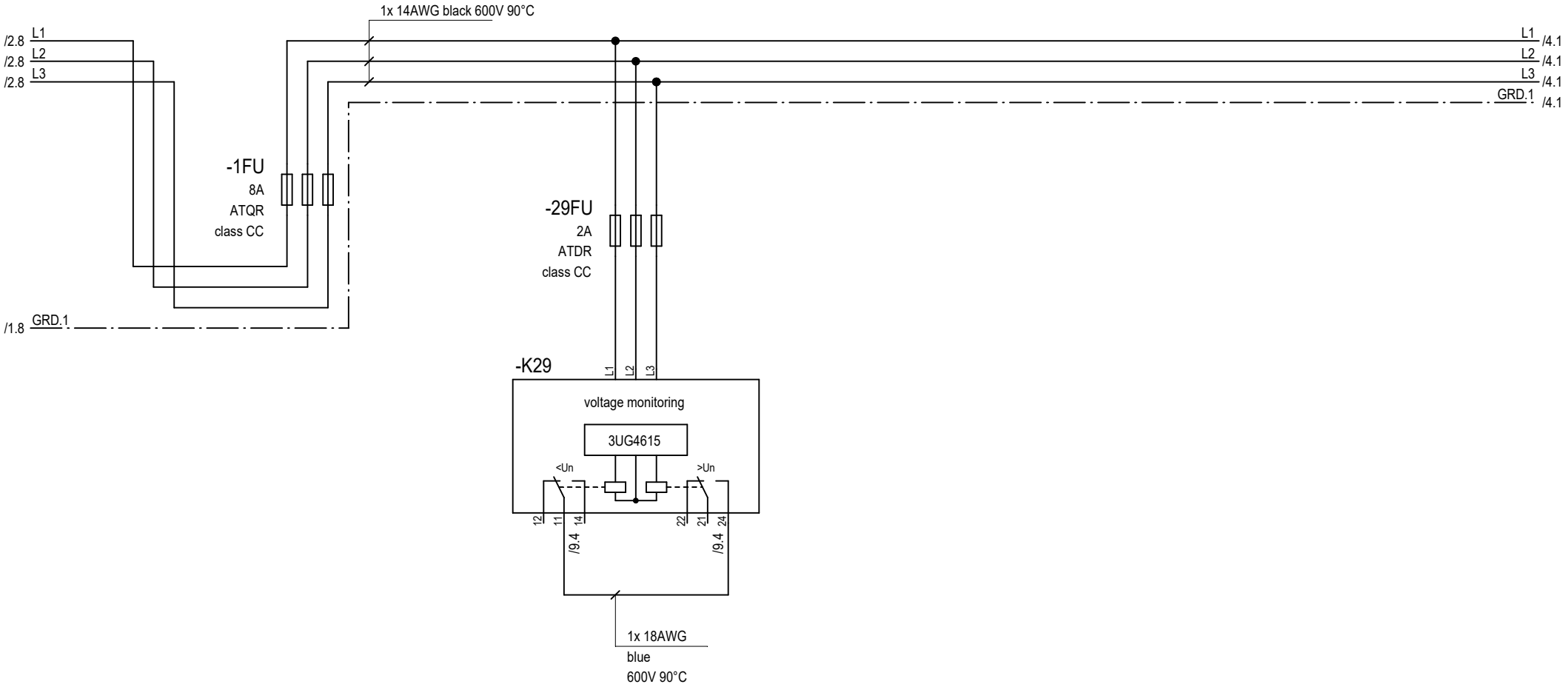
c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram	=
b				Drawn	M.Zeeh		Blower xFC+SC2	+
a				Released	M.Zeeh		input voltage	page 1
D	Change	Date	Name			SXB.XFC-U3030.03	SXB.XFC-U3032.06	16 Sht.

52



Function:	frequency converter + compressor motor
Group of function:	power unit

c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	M.Zeeh		Blower xFC+SC2	+	53
a				Released	M.Zeeh				page 2
D	Change	Date	Name			SXB.XFC-U3030.03	power unit	SXB.XFC-U3032.06	16 Sht.



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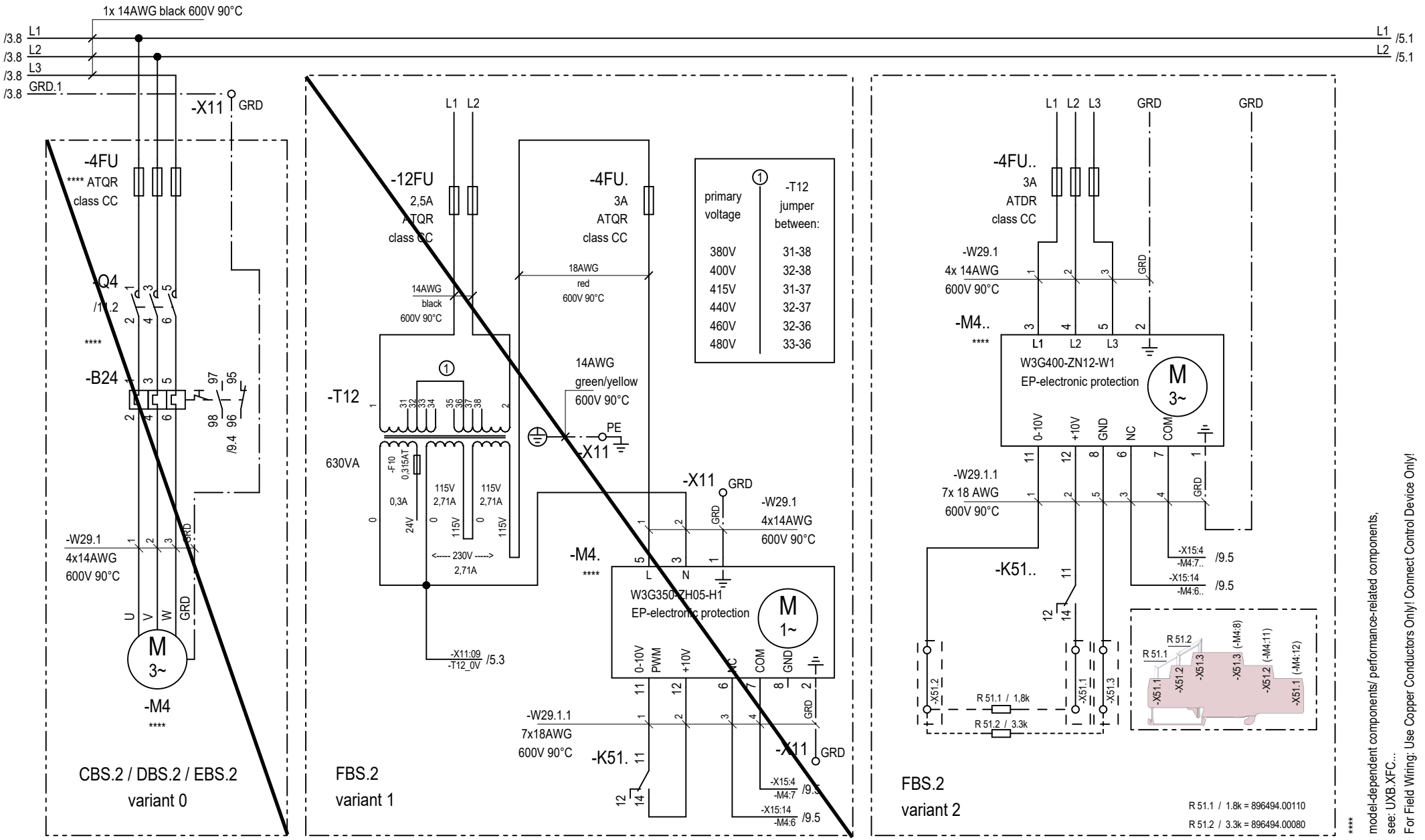
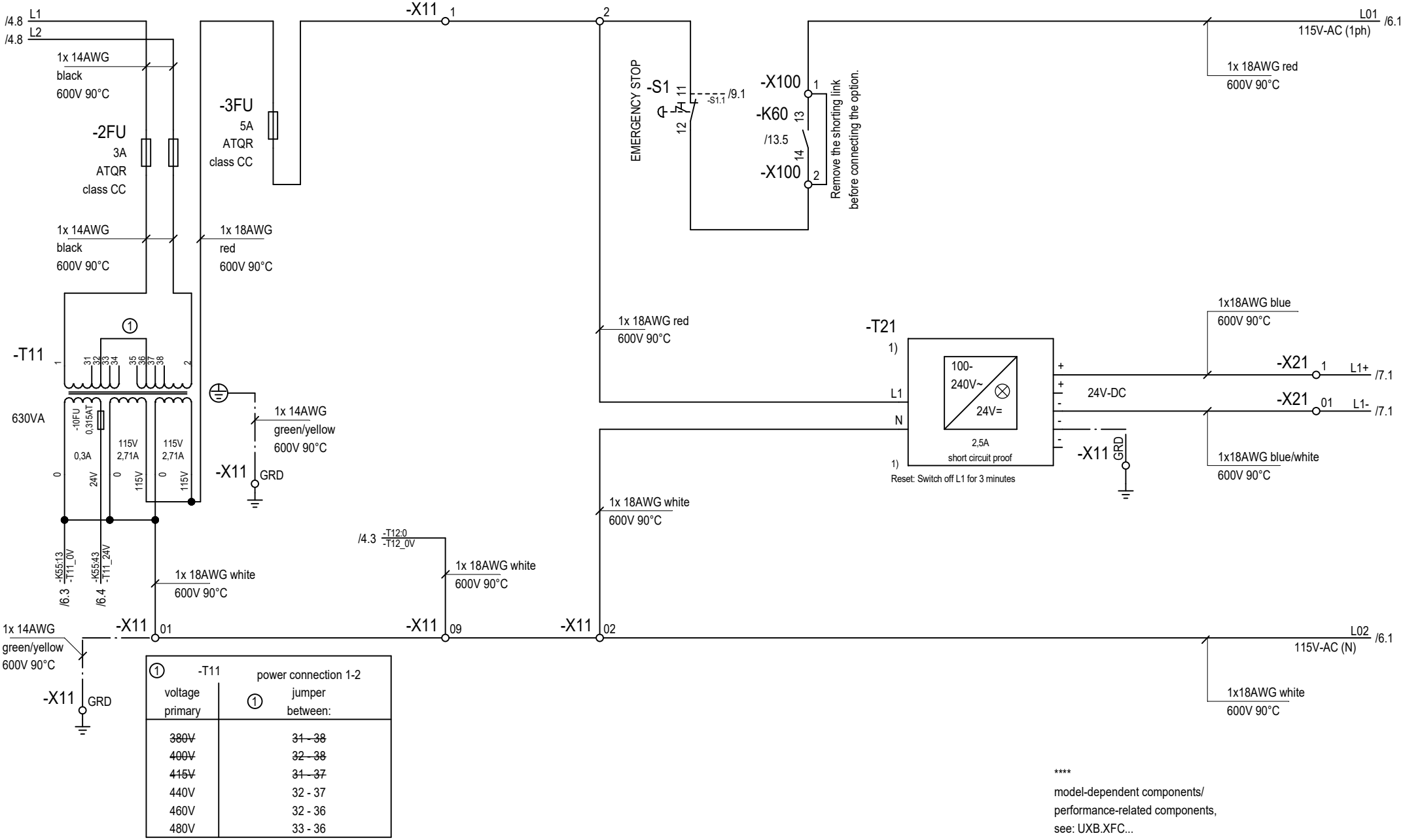
model-dependent components/
performance-related components,
see: UXB.XFC...

For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!

Function:			control voltage tapping		phase sequence relay					
Group of function:					/phase monitoring					
c				Date	30.06.2025		KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	M.Zeeh			Blower xFC+SC2	+	54
a				Released	M.Zeeh			power unit vent		page 3
D	Change	Date	Name				SXB.XFC-U3030.03		SXB.XFC-U3032.06	16 Sht.



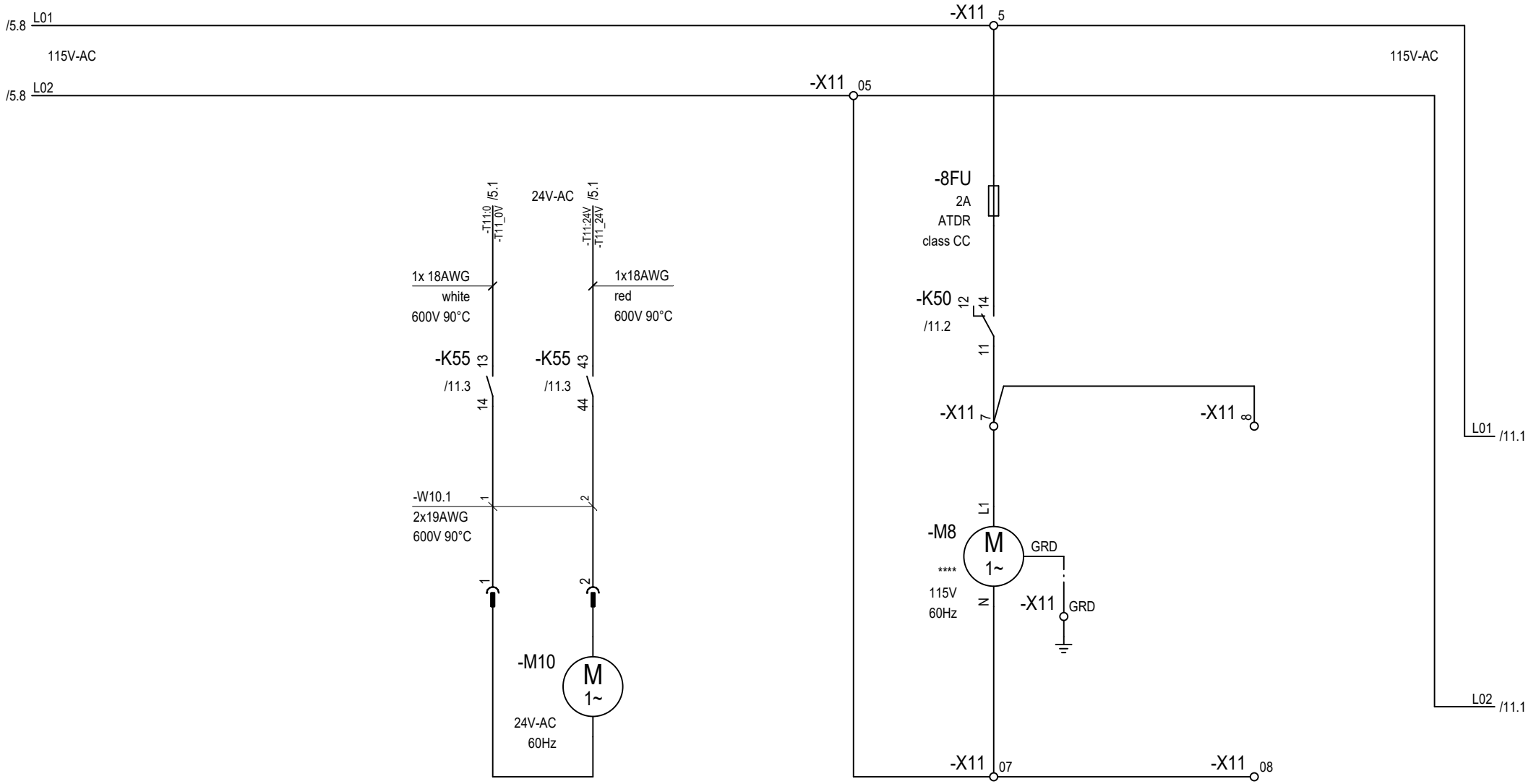
Function:						vent motor					
Group of function:						soundproofing casing					
c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram		=		
b				Drawn	M.Zeeh		Blower xFC+SC2		+		55
a				Released	M.Zeeh		power unit vent	SXB.XFC-U3032.06		page	4
D	Change	Date	Name								16 Sht.



① -T11 voltage primary	power connection 1-2 ① jumper between:
~~380V~~	~~31 - 38~~
~~400V~~	~~32 - 38~~
~~415V~~	~~31 - 37~~
440V	32 - 37
460V	32 - 36
480V	33 - 36

****
model-dependent components/
performance-related components,
see: UXB.XFC...

Function:	24V+115V/1~/60Hz						115V AC EMERGENCY STOP				
Group of function:	control voltage tapping						24V DC control voltage tapping				
c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram			=	
b				Drawn	M.Zeeh		Blower xFC+SC2			+	56
a				Released	M.Zeeh		control voltage				page 5
D	Change	Date	Name			SXB.XFC-U3030.03			SXB.XFC-U3032.06		16 Sht.



For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!

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model-dependent components/
performance-related components,
see: UXB.XFC...

Function:					vacuum pump						
Group of function:					Gear housing ventilation				controller ventilator (1)		
c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram			=	
b				Drawn	M.Zeeh		Blower xFC+SC2			+	57
a				Released	M.Zeeh		control		SXB.XFC-U3032.06		page 6
D	Change	Date	Name								16 Sht.

mode of operation control See service manual

/5.8 L1+ -X21 2 -X21 3 L1+ /10.5

24V-DC 24V-DC

/5.8 L1- -X21 02 -X21 03 L1- /10.5

Sigma Control 2 (SC2) - Main Control System (MCS)

-K20

MCS

SD card X5

1x14AWG
green/yellow
600V 90°C

-X11 GRD

X6

option COM-Module X4

RS485-FC X3

Ethernet X1

IO-Bus X2

communication module:
~~-DeviceNet~~
~~-Profinet IO-2P~~
~~-Profibus DPV0~~
~~-Modbus TCP-2P~~
~~-Modbus RTU~~
-EtherNet/IP-2P M40

WH BN

P+ /12.8

N- /12.8

***

W 255
LiYCY
2x 24 AWG
(7.7627.0)

-W81
3x 2x 24 AWG
screened
(7.7630.xxxxx)

-K21

X1 I/O-BUS

/8.3 X4

3 L+
2 L-
1 FE

IOM 1

I/O-BUS X2

1x14AWG
green/yellow
600V 90°C

-X11 GRD

Sigma Control 2 (SC2)
inputs/outputs Interface module (IOM1)

***

-Rated motor current
- ON/OFF frequency converter
- FAILURE frequency converter
- reset FAILURE frequency converter
- speed set point to frequency converter

Function: solenoid valve 24V-DC

Group of function: Oil return

c				Date	30.06.2025
b				Drawn	M.Zeeh
a				Released	M.Zeeh
D	Change	Date	Name		

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram
Blower xFC+SC2
Oil return + SC2 + IOM

SXB.XFC-U3032.06

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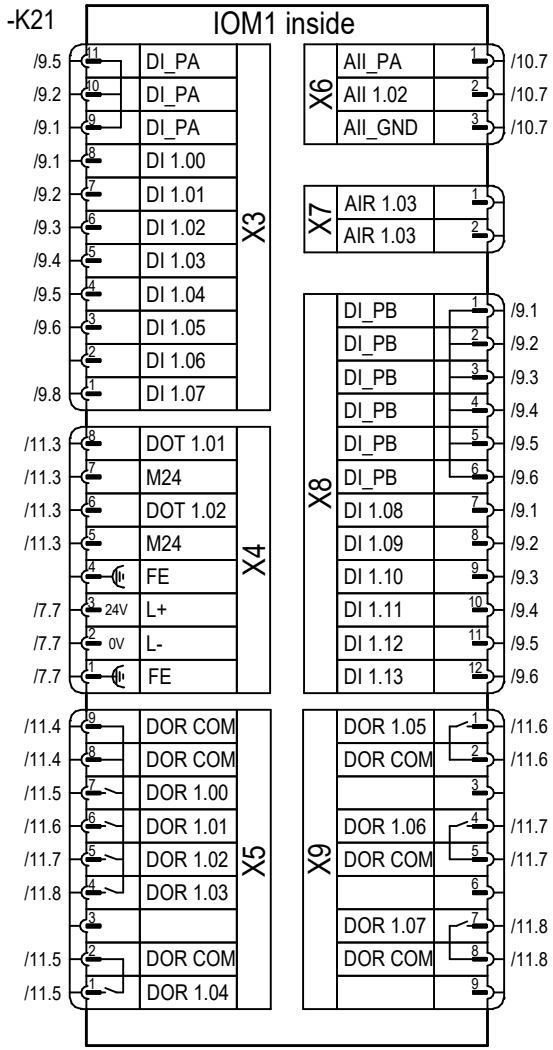

-K21

IOM1 external

/10.2	AII 1.00	X11	X22	DI 1.00	
/10.4	AII 1.01	X12	X23	DI 1.01	
	AII 1.02	X13	X24	DI 1.02	
/10.2	AIR 1.00	X14	X25	DI 1.03	
/10.4	AIR 1.01	X15	X26	DI 1.04	
/10.6	AIR 1.02	X16	X27	DI 1.05	
/10.7	AIR 1.03	X17	X28	DI 1.06	/9.7
	DI 1.08	X18	X29	DI 1.07	
	DI 1.09	X19	X30	DOT 1.00	/11.2
	DI 1.14	X20	X31	DOT 1.01	
	DI 1.15	X21	X32	DOT 1.02	

Function:

Group of function:

c			Date	30.06.2025	
b			Drawn	M.Zeeh	
a			Released	M.Zeeh	
D	Change	Date	Name		

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram

Blower xFC+SC2

IOM-configuration

SXB.XFC-U3032.06

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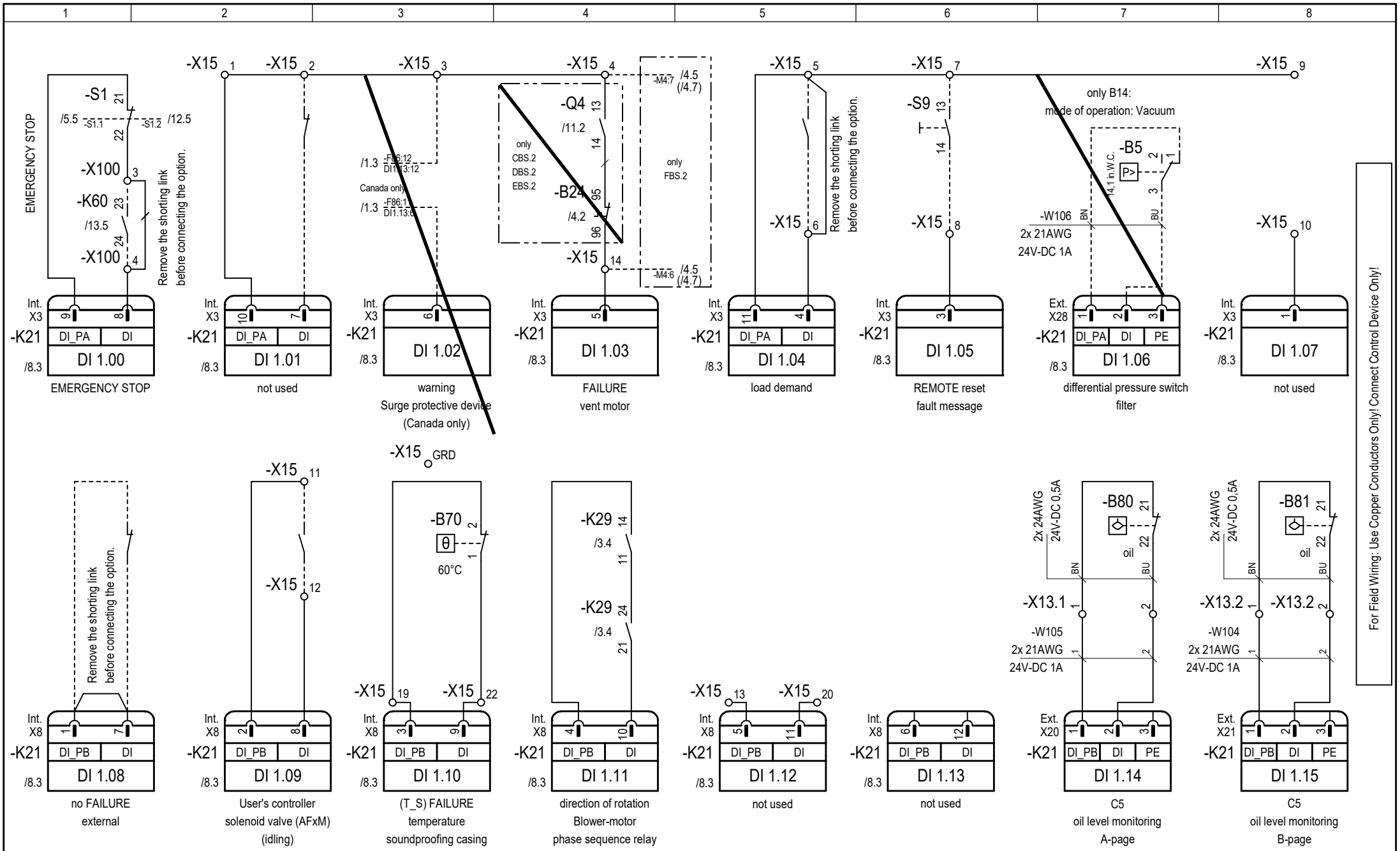
16 Sht.



Function:

Group of function:

c				Date	30.06.2025
b				Drawn	M.Zeeh
a				Released	M.Zeeh
D	Change	Date	Name		

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram

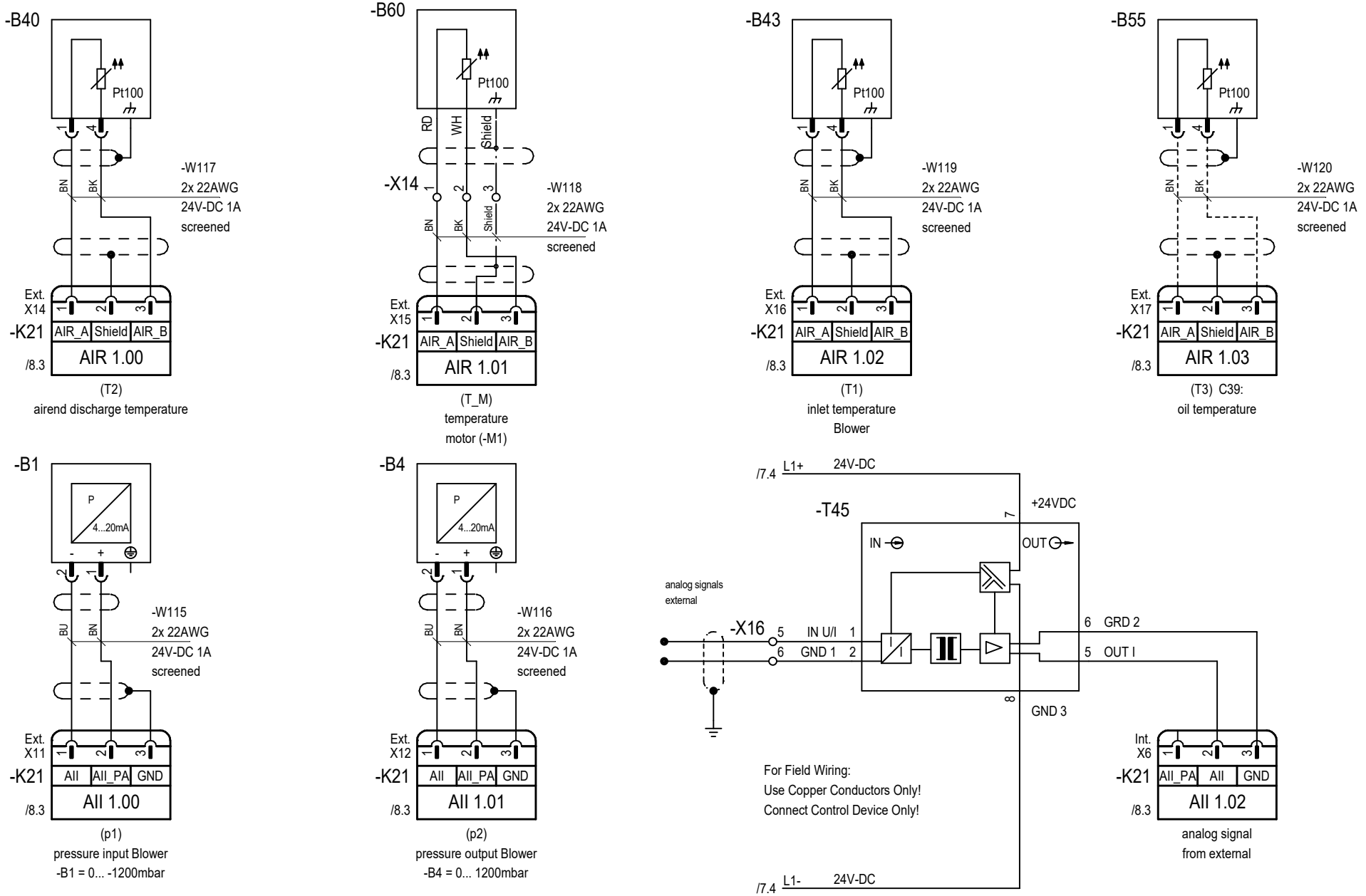
Blower xFC+SC2

digital inputs IOM

SXB.XFC-U3032.06

page 9

16 Sht.



Function:

Group of function:

c				Date	30.06.2025	
b				Drawn	M.Zeeh	
a				Released	M.Zeeh	
D	Change	Date	Name			

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram

Blower xFC+SC2

analog inputs IOM

SXB.XFC-U3032.06

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16 Sht.

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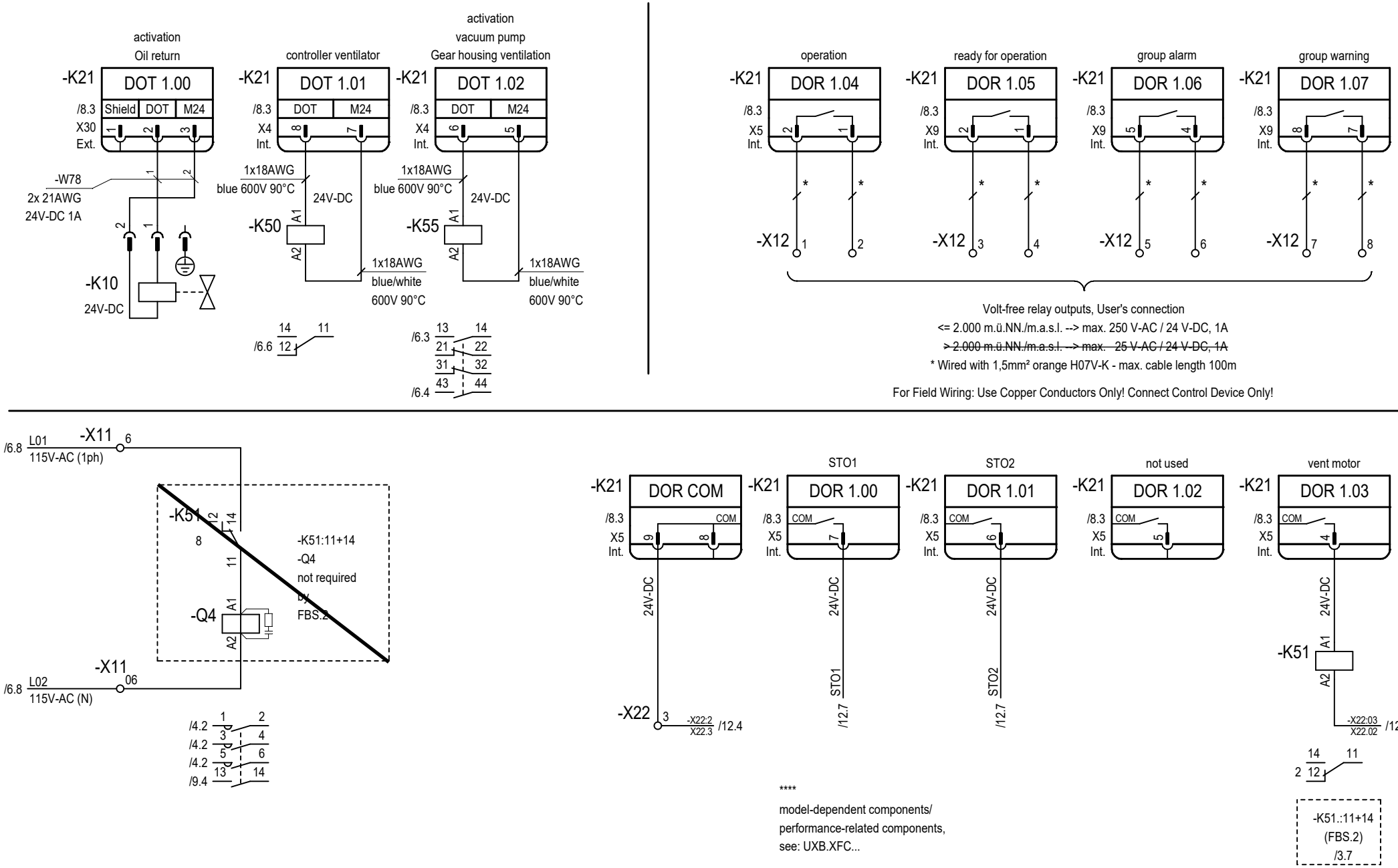

Function:	vent motor (3ph)				
Group of function:	soundproofing casing				

c			Date	30.06.2025	
b			Drawn	M.Zeeh	
a	DOT1.02 -X15	13.05.15	Released	M.Zeeh	
D	Change	Date	Name		

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram
Blower xFC+SC2
Relay-outputs IOM

SXB.XFC-U3032.06

page 11
16 Sht.

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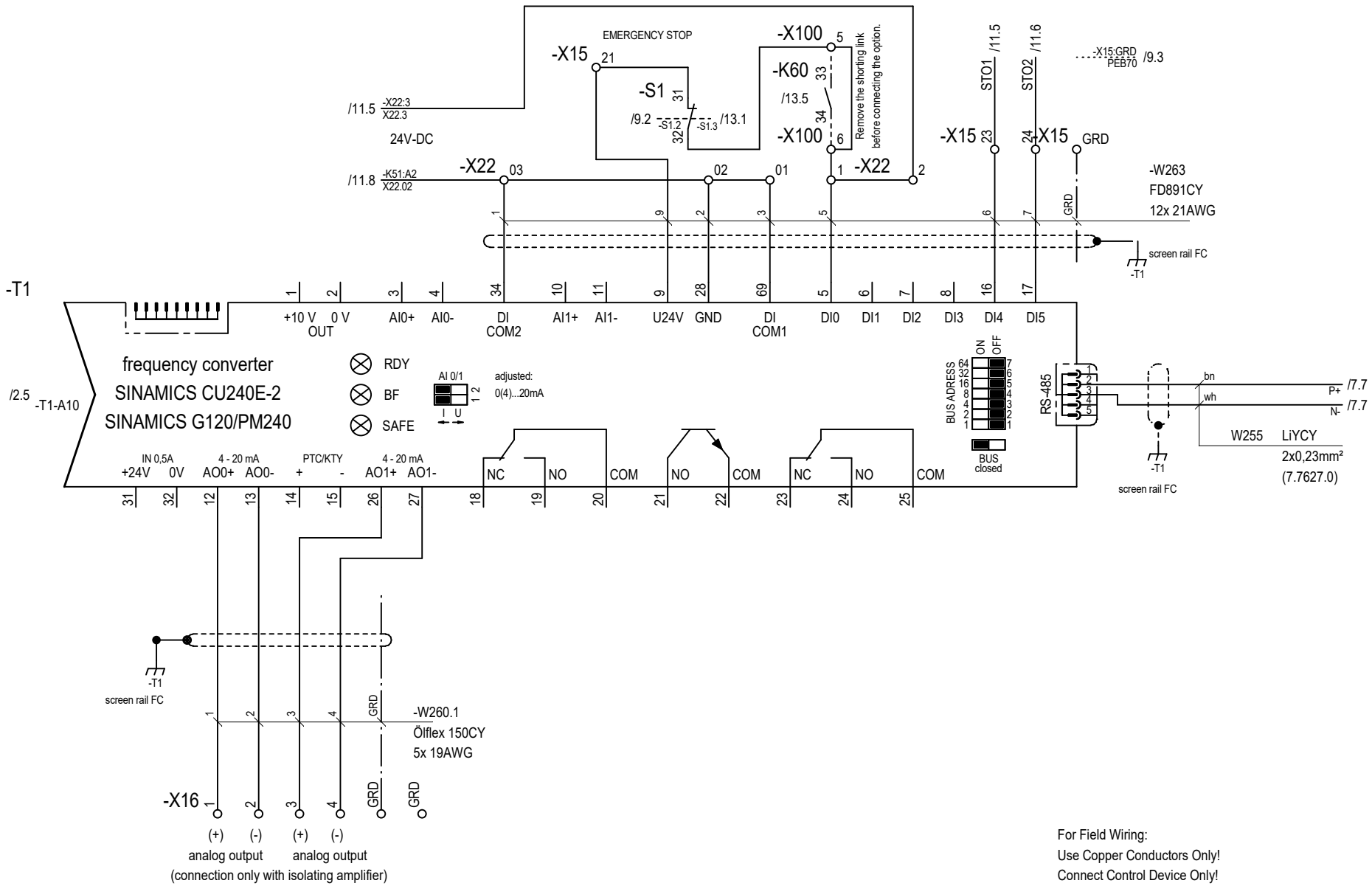

Function:

Group of function:

c				Date	30.06.2025
b				Drawn	M.Zeeh
a				Released	M.Zeeh
D	Change	Date	Name		

KAESER KOMPRESSOREN

SXB.XFC-U3030.03

wiring diagram

Blower xFC+SC2

frequency converter

SXB.XFC-U3032.06

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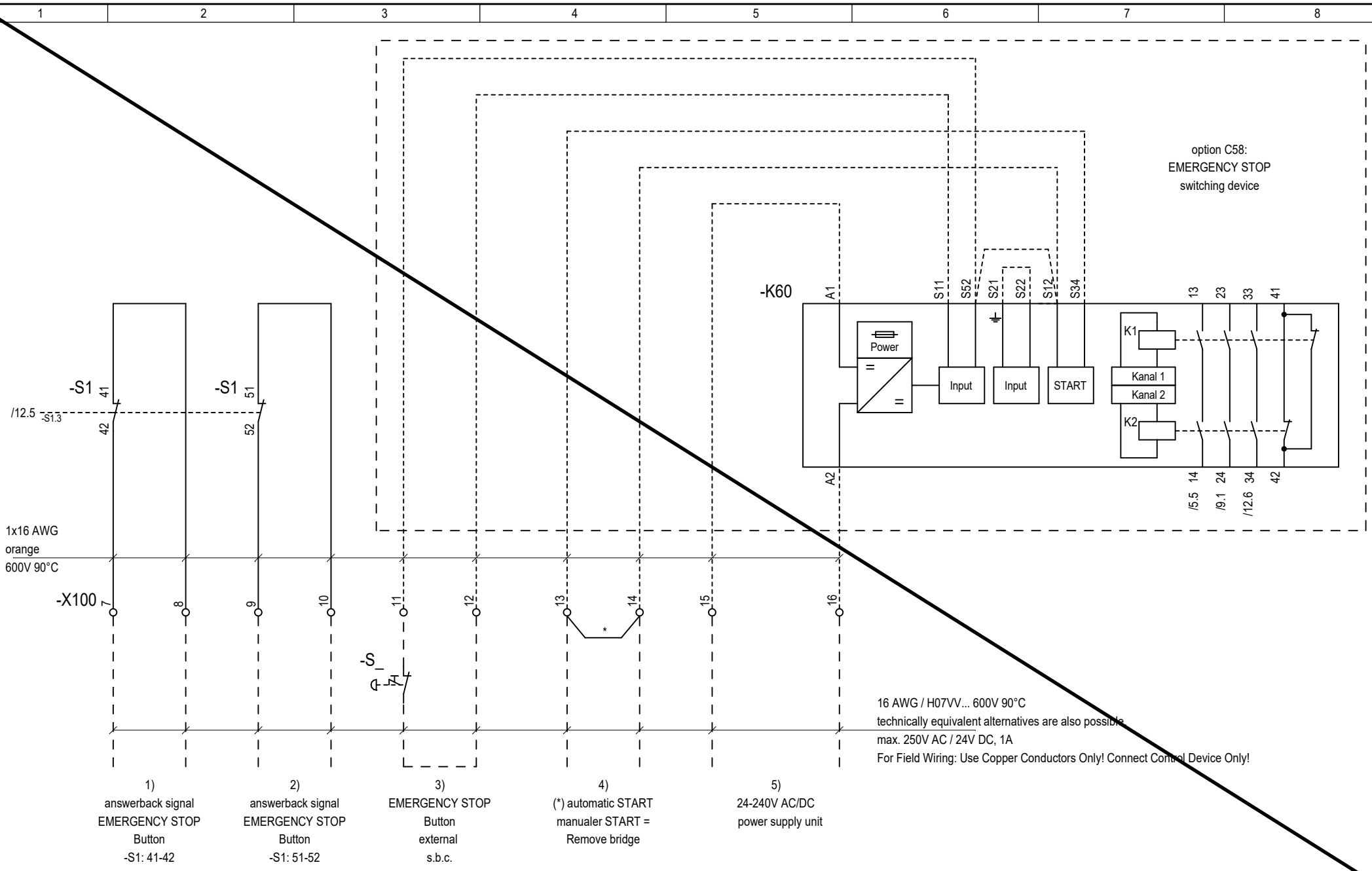
16 Sht.



Function: connection EMERGENCY STOP external — option EMERGENCY STOP-switching device

Group of function:

c			Date	30.06.2025	
b			Drawn	M.Zeeh	
a			Released	M.Zeeh	
D	Change	Date	Name		

KAESER KOMPRESSOREN

wiring diagram
Blower xFC+SC2
User's controller EMERGENCY STOP

SXB.XFC-U3032.06

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fig.: 1 Handling control line terminal

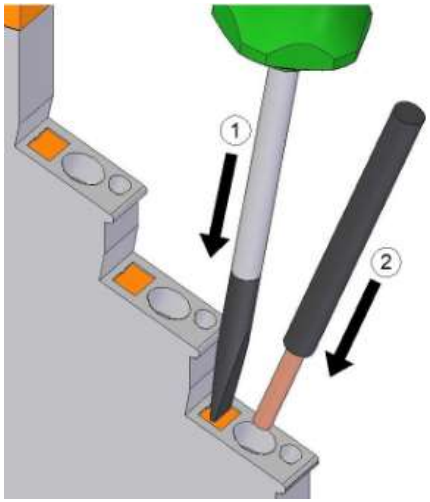


fig.: 2 Handling supply terminals

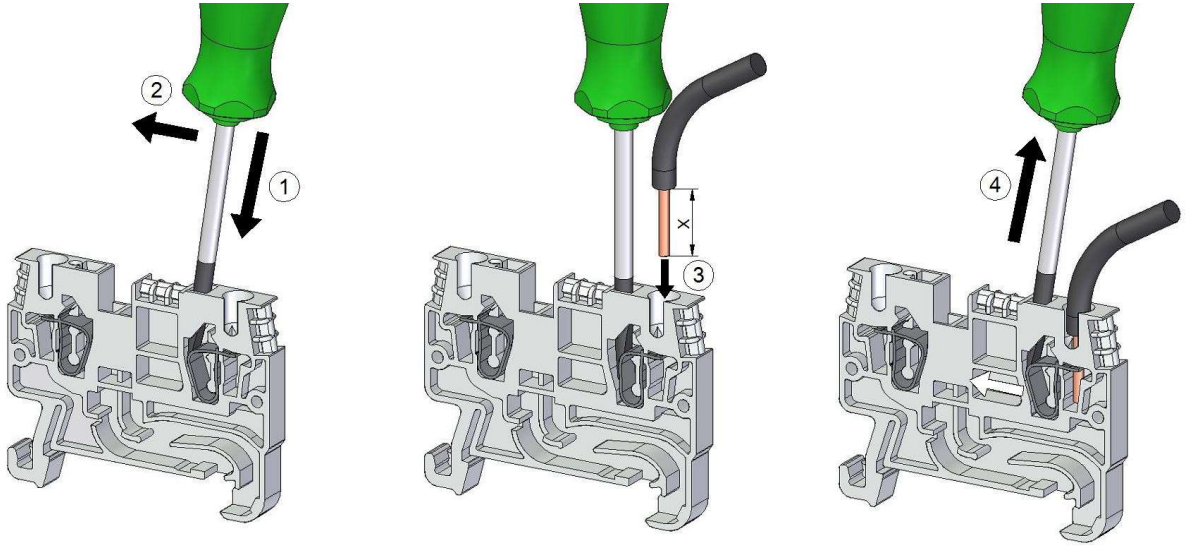
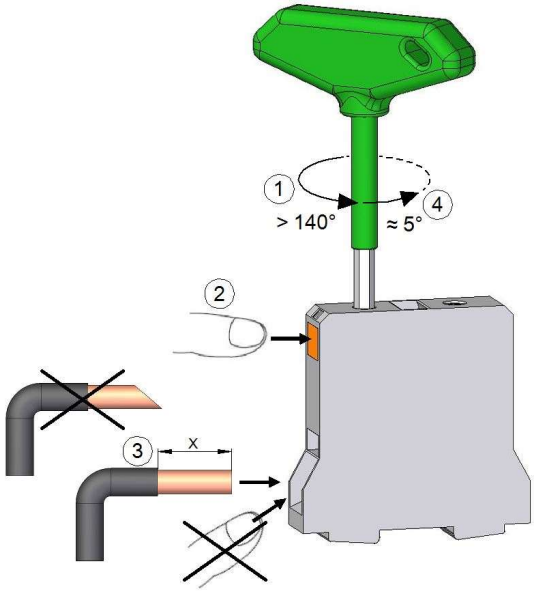


fig.: 3 Handling supply terminals



Function:

Group of function:

c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	M.Zeeh		Blower xFC+SC2	+	65
a				Released	M.Zeeh			page	14
D	Change	Date	Name			SXB.XFC-U3030.03	Handling terminals	SXB.XFC-U3032.06	16 Sht.

fig.: 1 Feed line connection

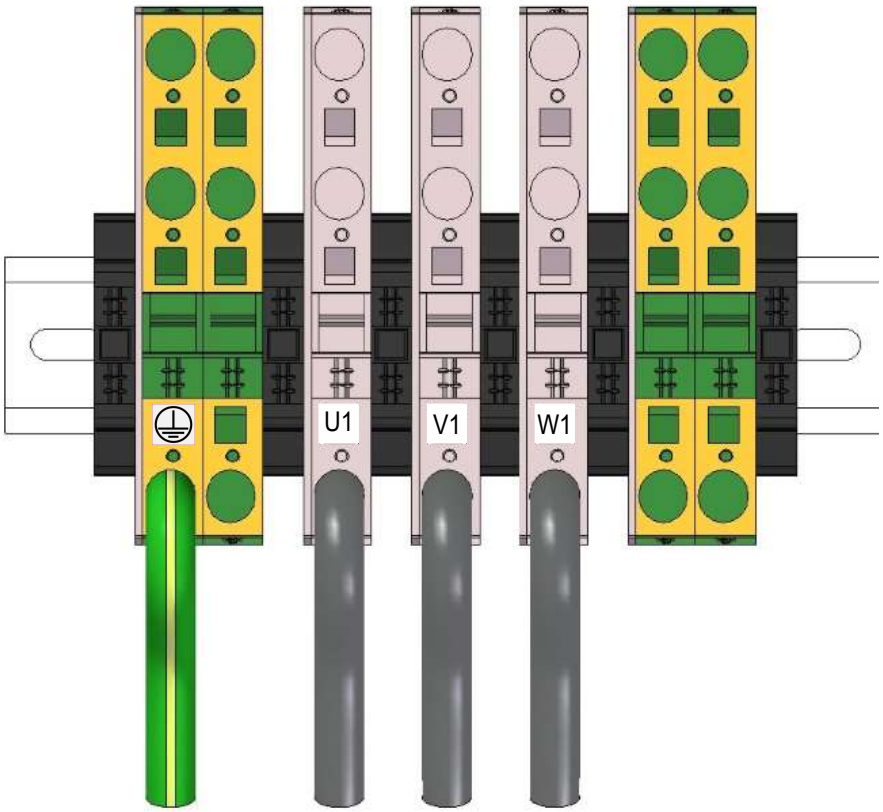
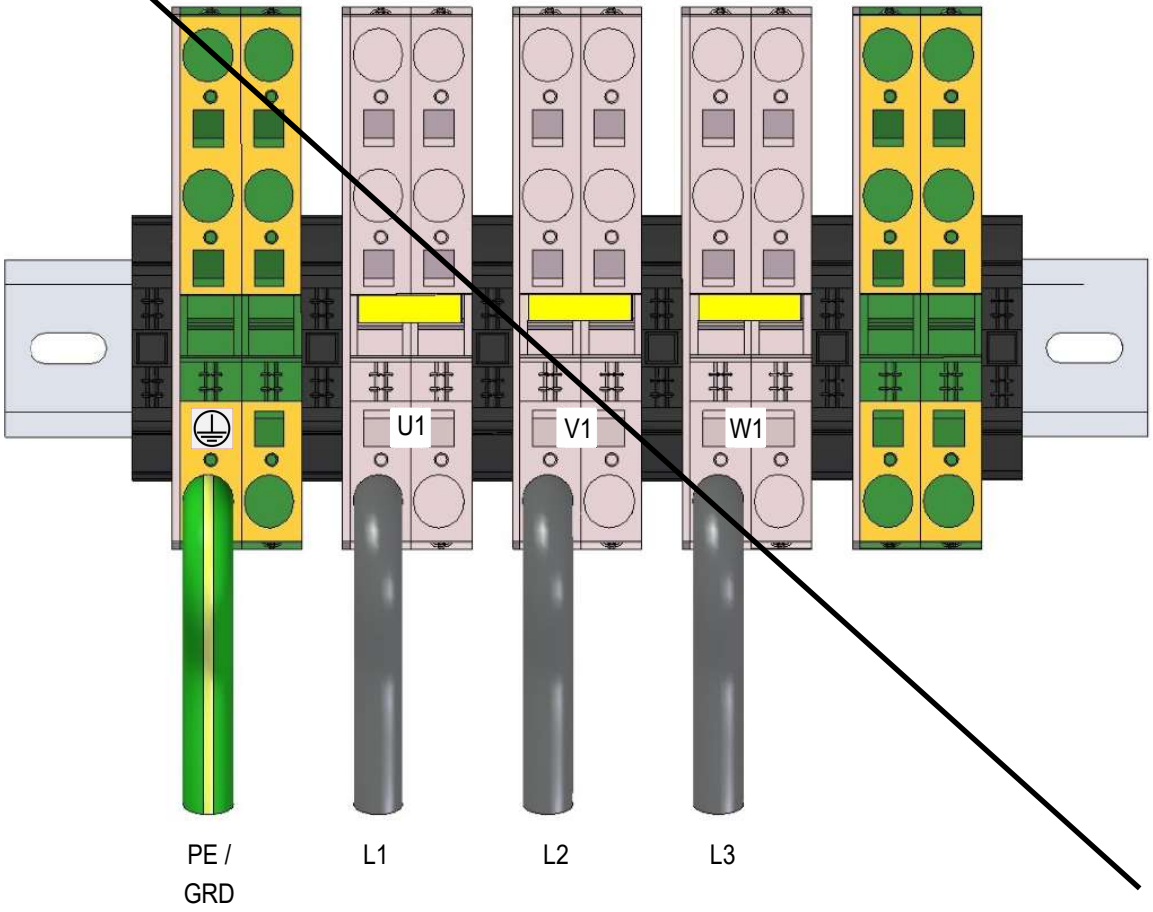


fig.: 1 Feed line connection (Canada only)



Function:

Group of function:

c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	M.Zeeh		Blower xFC+SC2	+	66
a				Released	M.Zeeh		Feed line connection		page 15
D	Change	Date	Name			SXB.XFC-U3030.03		SXB.XFC-U3032.06	16 Sht.

fig.: 1 Feed line connection

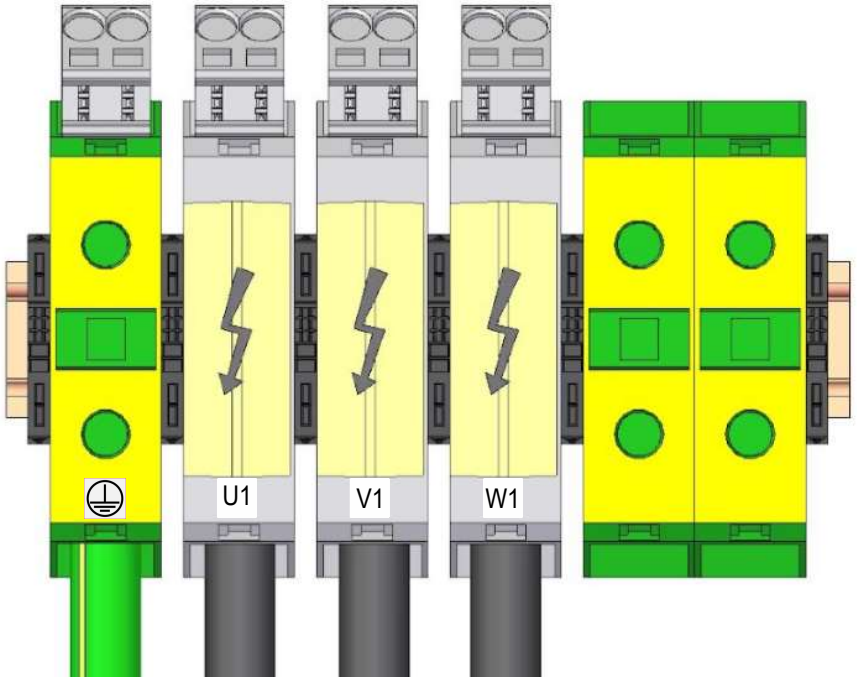
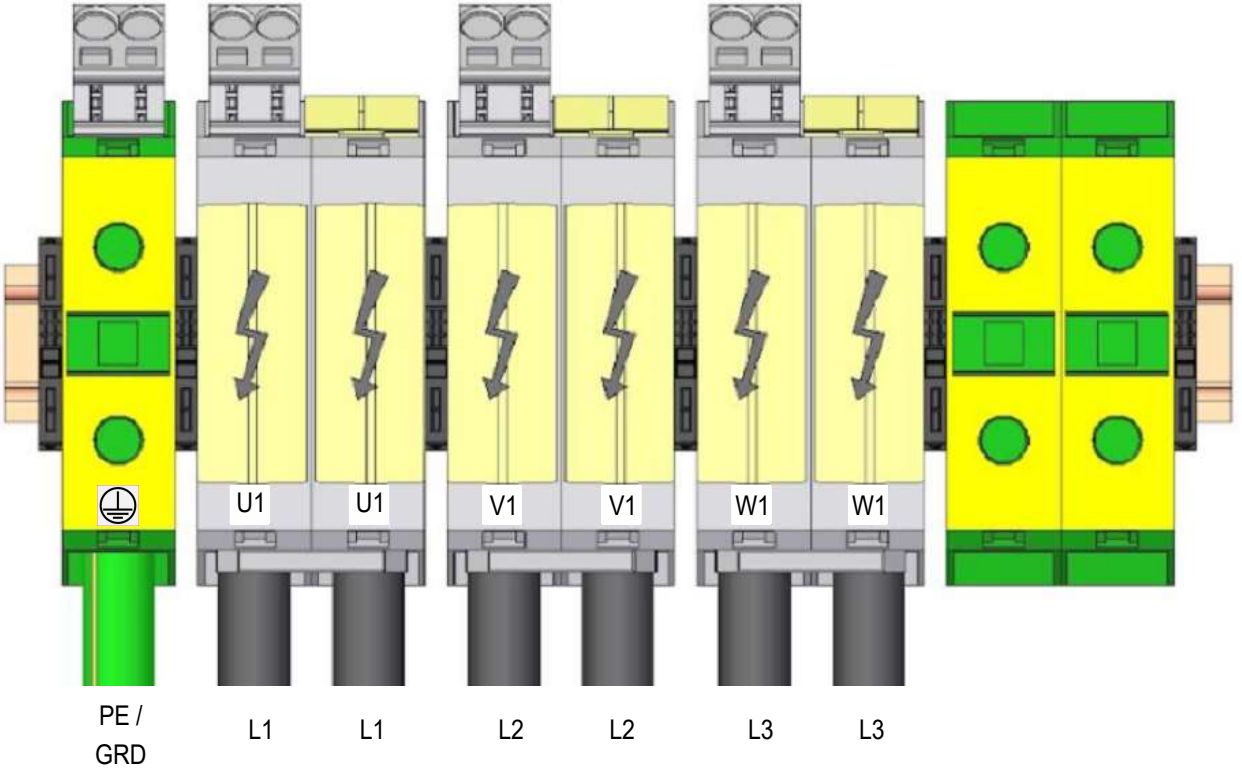


fig.: 2 Feed line connection



Function:

Group of function:

c				Date	30.06.2025	KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	M.Zeeh		Blower xFC+SC2	+	67
a				Released	M.Zeeh		Feed line connection		page 16
D	Change	Date	Name			SXB.XFC-U3030.03		SXB.XFC-U3032.06	16 Sht.

terminal strip	terminal-no.	cable-no. (inside)	destination inside: name of device	destination inside: connection	location	jumper wire	link	destination external: connection	destination external: name of device	cable-no. (external)
terminal strip: -X0 (total 6 terminals)	GRD		unit frame		/1.5			GRD	-X11	H07V2-K 12 AWGxgreen/yellow
	GRD		-T1	GRD	/1.5					
	U1		-T1	U1	/1.4				-supply	-s.b.c. **
	V1		-T1	V1	/1.4				-supply	-s.b.c. **
	W1		-T1	W1	/1.4				-supply	-s.b.c. **
	GRD		control panel		/1.5				-supply	-s.b.c. **
terminal strip: -X11 (total 20 terminals)	GRD				/1.7			GRD	-X0	H07V2-K 12 AWGxgreen/yellow
	GRD	-1x14AWG green/yellow	-K20	X6	/4.2			GRD	+****-M4	-W29.1 4x 14AWG GRD
	GRD		-K21-X4	1	/7.6					
	GRD				/6.6			GRD	-M8	-W7.1 3x16AWG 600V 90° GRD
	GRD		-T11	GRD	/5.2			-	-T21	
	GRD				/5.1					
	1		-3FU		/5.3	X	1–2			
	01		-T11	0	/5.2	X	01–02–05–06–07–08–09			
	2		-T21	L1	/5.4		1–2	11	-S1	
	02		-T21	N	/5.4		01–09			
	5		-X100	1	/6.6		5–6		-8FU	
	05				/6.5		01–09			
	6		-K51	14	/11.1		5–6			
	06		-Q4	A2	/11.1		01–09			
	7		-K50	11	/6.6		7–8	L1	-M8	-W7.1 3x16AWG 600V 90° 1
	07				/6.6		01–09	N	-M8	-W7.1 3x16AWG 600V 90° 2
	8				/6.7		7–8			
	08				/6.7		01–09			
	9				/3.7					
	09	X	-T12	0	/5.3		01–09			
terminal strip: -X12 (total 8 terminals)	1		-K21-X5	2	/11.5					
	2		-K21-X5	1	/11.5					
	3		-K21-X9	2	/11.6					
	4		-K21-X9	1	/11.6					
	5		-K21-X9	5	/11.7					
	6		-K21-X9	4	/11.7					
	7		-K21-X9	8	/11.8					
	8		-K21-X9	7	/11.8					
terminal strip (cable joint): -X13.1 (total 2 terminals)	1	-W117 1	-K21-X20	1	/9.7			21	-B80	-W117 BN
	2	-W117 2	-K21-X20	2	/9.7			22	-B80	-W117 BU
terminal strip (cable joint): -X13.2 (total 2 terminals)	1	-W117 1	-K21-X21	1	/9.8			21	-B81	-W117 BN
	2	-W117 2	-K21-X21	2	/9.8			22	-B81	-W117 BU
terminal strip (cable joint): -X14 (total 3 terminals)	1	-W118 BN	-K21-X15	1	/10.3			RD	-B60	
	2	-W118 BK	-K21-X15	3	/10.4			WH	-B60	
	3	-W118 Shield	-K21-X15	2	/10.4			Shield	-B60	

cable-no.		destination external		terminal strip				destination inside		cable-no.		
-Ex2 2x 16AWG		name of device	connection	terminal-no.	link	terminal legend	jumper wire	location	name of device	connection	-W260.1 ÖF150CY 5G0,75mm²	-W263 12x 21AWG
terminal strip: -X15 total 22 terminals												
				1				/9.2	-K21 -X3	10		
				2				/9.2				
				3				/9.3	-F86	12		
				4				/9.4	-Q4	13		
				5				/9.5	-K21 -X3	11		
				6				/9.5	-K21 -X3	4		
1		-S9	13	7				/9.6				
2		-S9	14	8				/9.6	-K21 -X3	3		
				9				/9.8				
				10				/9.8	-K21 -X3	1		
				11				/9.2	-K21 -X8	2		
				12				/9.2	-K21 -X8	8		
				13				/9.5	-K21 -X8	5		
		-B24	96	14				/9.4	-K21 -X3	5		
	1	-B70	2	19				/9.3	-K21 -X8	3		
				20				/9.5	-K21 -X8	11		
	9	-T1	9	21				/12.5	-S1	31		
	2	-B70	1	22				/9.3	-K21 -X8	9		
		-K21 -X5	7	23				/12.7	-T1	16		6
	GRD	-K21 -X5	6	24				/12.7	-T1	17		7
		-B70	GRD	GRD				/9.3				
	GRD	-T1		GRD				/12.7				
terminal strip: -X16 total 8 terminals												
	(+)			1				/12.3	-T1	12	1	
	(-)			2				/12.3	-T1	13	2	
	(+)			3				/12.3	-T1	26	3	
	(-)			4				/12.3	-T1	27	4	
	(+)			5				/10.5	-T45	1		
	(-)			6				/10.5	-T45	2		
				GRD				/12.4	-.		GRD	
				GRD				/12.4				
terminal strip: -X21 total 6 terminals												
				1				/5.8	-T21	+		
				01				/5.8	-T21	-		
				2				/7.2				
				02				/7.2				
		-T45	7	3				/7.3	-K21-X4	3		
		-T45	8	03				/7.3	-K21-X4	2		
terminal strip: -X22 total 6 terminals												
		-X100	6	1				/12.6	-T1	5		5
				01				/12.5	-T1	69		3
				2				/12.6				
				02				/12.5	-T1	28		2
				3				/11.4	-K21 -X5	9		
		-K51	A2	03				/12.4	-T1	34		1

H Change | a | b | c
Date | | | 30.06.2025
Name | | Drawn | M.Zeeh
| | Released | M.Zeeh

KAESER KOMPRESSOREN

terminal connection

-X15,-X16,-X21,-X22

KXB.XFC-U3032.06

+ | =

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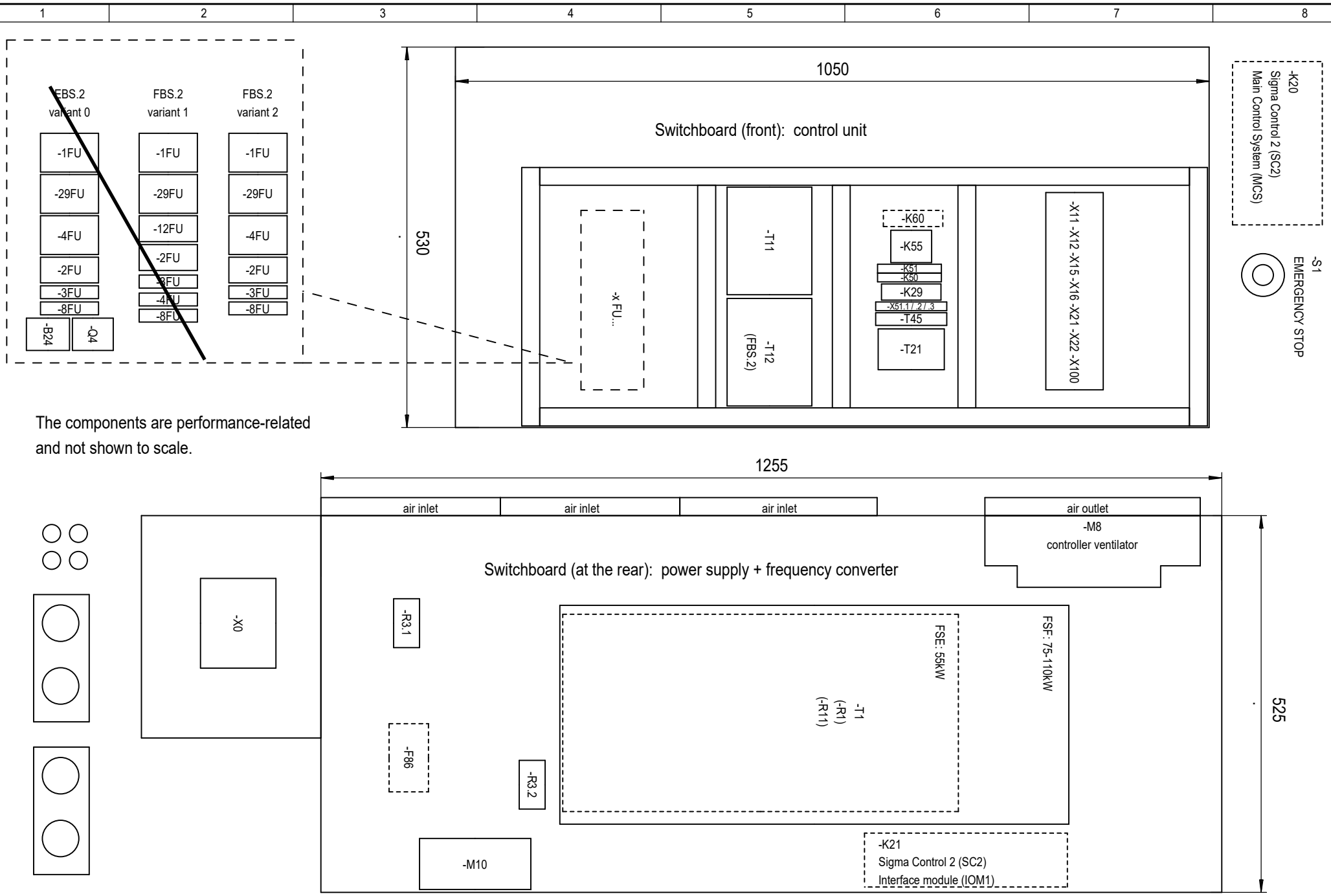
3 Sht. 2

terminal strip: -X100
total 16 terminals

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
cable-no.																	
	H07V2-K 1,5mm² orange							X	X	X	X	X	X	X	X	X	X
destination inside	connection	5	12	22	8	32	1	42	41	52	51	S52	S11	S34	S12	A1	A2
	name of device	-X11	-S1	-S1	-K21 -X3	-S1	-X22	-S1	-S1	-S1	-S1	-K60	-K60	-K60	-K60	-K60	-K60
terminal strip	location	/5.5	/5.5	/9.1	/9.1	/12.6	/12.6	/13.2	/13.2	/13.2	/13.3	/13.3	/13.3	/13.4	/13.4	/13.5	/13.5
	jumper wire																
	terminal legend																
	link																
	terminal-no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
destination external	connection	13	14	23	24	33	34										
	name of device	-K60	-K60	-K60	-K60	-K60	-K60					-S_					
cable-no.								1)	1)	2)	2)	3)	3)	4)	4)	5)	5)

c				Date	30.06.2025	KAESER KOMPRESSOREN	terminal connection
b				Drawn	M.Zeeh		
a				Released	M.Zeeh		-X100
H	Change	Date	Name				

KXB.XFC-U3032.06



c				Date	30.06.2025
b				Drawn	M.Zeeh
a	FU adaptation	2017/07	Rössler	Released	M.Zeeh
l	Change	Date	Name		

KAESER KOMPRESSOREN

lay-out
control cabinet
Switchboard 60-150hp / 45-110kW

AXB.XFC-U3032.06

page 2
2 Sht.

This surface specification is valid for blower airends and packages as well as dryers and WVC pumps (without customer specific modifications each).

Category 1.: Cast parts

Category 1.1.: Priming of cast parts

These are to be touched up by hand with the appropriate primer to bind any foundry sand that may remain in the drainage spaces.

Category	Process	Material	Manufacturer	KAESER part No.
1.1.1.	Priming before machining (applies to all cast parts except special steel and Ni-resist castings)	Tarponal – PUR/zinc powder primer, RAL 7012, basalt grey, matt, coating thickness: 30-40 µm alternatively Immersion priming 1706793-W, Fendt grey Coating thickness: 70-90 µm	TEKNOS Groß & Perthun	9.4004.0 None
1.1.2.	Base colour for drainage spaces and for touching up (applies to all cast parts)	Tarponal – PUR/zinc powder primer, RAL 7012, basalt grey, matt, coating thickness: 30-40 µm	TEKNOS	9.4004.0

Category 2.: Powder coated parts

The powder coating of pre-fabricated parts complies at least with the corrosion protection of EN ISO 12944-2 to category C3-m.

Surface has to be cleaned of grease, oil, scale and oxidation products.
Depending on category, one of the following surface pretreatment is necessary.

Category	Permissible pretreatment		
	Nanoceramic pretreatment	Iron phosphating	Zinc phosphating
2.1.1.	X		
2.1.2.	X	X	X
2.1.3.	X	X	X
2.2.1.	X		
2.2.2.	X	X	X
2.2.3.	X	X	X
2.3.1.	X	X	X
2.4.1.	X	X	X
2.5.1.	X	X	X

Category 2.1. Anthracite grey parts

Category	Process	Material	Manufacturer	KAESER part No.
2.1.1.	Powder coating	Polyester powder MEGAPOL F KAESER-GREY NEU ST/GL (140-11-7506-225) similar to RAL 7016 Coating thickness: 70-100 µm	Cenaris GmbH	None
		Polyester powder TGIC free “TRIBO BUCC.” (86114) anthracite RAL 7016 Coating thickness: 70-100 µm	Inver S.p.A	None
2.1.2.	Powder coating	Polyester powder INFRALIT PE 8312-50 (DH80019020) KAESER-anthracite similar to RAL 7016 Coating thickness: 90-110 µm	TEKNOS or alternative products	9.4058.0

2.1.3.	Powder coating	Polyester powder INFRALIT PE 8312-50 (DH80019020) KAESER-anthracite similar to RAL 7016 Coating thickness: 90-110 µm	TEKNOS	9.4058.0

Category 2.2. Broom yellow parts

Category	Process	Material	Manufacturer	KAESER part No.
2.2.1.	Powder coating	Polyester powder MEGAPOL F KAESER-YELLOW NEU ST/GL (140-11-1501-225) similar to RAL 1032 Coating thickness: 70-100 µm	Cenaris GmbH	None
		Polyester powder P.11-11102-GL2Z (structure, shining) KAESER-yellow similar to RAL 1032 Coating thickness: 70-100 µm	Colore S.r.l.	None
2.2.2.	Powder coating	Polyester powder INFRALIT PE 8312-50 (DH10019020) KAESER-yellow similar to RAL 1032 Coating thickness: 90-110 µm	TEKNOS or alternative products	9.4080.0
2.2.3	Powder coating	Polyester powder INFRALIT PE 8312-50 (DH10019020) KAESER-yellow similar to RAL 1032 Coating thickness: 90-110 µm	TEKNOS	9.4080.0

Category 2.3. Brilliant blue parts

Category	Process	Material	Manufacturer	KAESER part No.
2.3.1.	Powder coating	Universal-Polyester powder 5911 (5911 0020 5007) brillant blue RAL 5007 HR Coating thickness: 70 µm-100 µm	Brillux GmbH & Co. KG or alternative products	9.4086.0

Category 2.4. Light grey parts

Category	Process	Material	Manufacturer	KAESER part No.
2.4.1.	Powder coating	Universal-Polyester powder 5910 (5910 0020 7035) light grey RAL 7035 GL Coating thickness: 70 µm-100 µm	Brillux GmbH & Co. KG or alternative products	9.4067.0

Kategorie 2.5. White-aluminium coloured parts

Category	Process	Material	Manufacturer	KAESER part No.
2.5.1.	Powder coating	Polyester powder FREIOTHERM-powder lacquer PP1003L white-aluminium RAL 9006 Coating thickness: 70 µm-100 µm	Emil Frei GmbH & Co. KG or alternative products	None

Category 3.: Painted parts

Surface has to be cleaned of grease, oil, scale and oxidation products.
Depending on category, one of the following surface pretreatment is necessary

Category 3.1.: Base coat

Category	Process	Material	Manufacturer	KAESER part No.
3.1.1. (valid for production drawing, referring to category 3.1.2.)	Base coat (preferred variant)	2K- EP-base coat: INERTA PRIMER 3210-10 Grey white RAL 9002 with INERTA HARDENER 7200 and TEKNOSOLV 6750 (or TEKNOSOLV 9506 or 6720) Coating thickness: 40-80 µm	 TEKNOS TEKNOS TEKNOS	 895512.0 895513.0 895514.0
	Base coat	1K- PVB-base coat: PercoTop 1K Primer 010 CS310 light grey with PercoTop Thinner Fast CS610 (optional PercoTop Thinner Standard CS600) Coating thickness: 20-60 µm	 AXALTA COATING SYSTEMS AXALTA COATING SYSTEMS	 None None
	Base coat	2K- EP-Base filler: BASF FC85-7132 Beige grey with hardener SC29-0028 and dilution SV41-0381 Coating thickness: 60-100 µm	 BASF Coatings BASF Coatings BASF Coatings	 None None None
	Base coat	The following base coating is only permissible for components of HB 950 C, HB 1300 PI and HB 1600 PI		

		2K- PU-base coat: BUCOPUR 2K-PU base (826-ff) light grey RAL 7035 with BUCOPUR hardener 116-007 and BUCO dilution 111-016 or 111-016-1 Coating thickness: 40-80 µm	BUCOLIN BUCOLIN BUCOLIN	None None None

Category 3.2.: Anthracite top coat

Category	Process	Material	Manufacturer	KAESER part No.
3.2.1.	Top coat	TEKNODUR structure 3614 anthracite grey RAL 7016 with TEKNODUR hardener 7255-60 Coating thickness: 70-80 µm	TEKNOS TEKNOS	9.4053.20010 9.4001.1

Category 3.3.: Broom yellow top coat

Category	Process	Material	Manufacturer	KAESER part No.
3.3.1.	Top coat	2K-AC-structure lacquer 3614, RAL 1032 broom yellow with TEKNODUR hardener 7255-60 Coating thickness: 70-80 µm	TEKNOS TEKNOS	9.4095.2 9.4001.1

Category 3.4.: Light grey top coat

Category	Process	Material	Manufacturer	KAESER part No.
3.4.1.	Top coat	TEKNODUR structure 3615 RAL 7035 with TEKNODUR hardener 7255-60 Coating thickness: 70-80 µm	TEKNOS TEKNOS	891017.0 9.4001.1

Category 4: Motor

Category 4.1.: Base coat

Category	Process	Material	Manufacturer	KAESER part No.
4.1.1.	Base coat (by motor manufacturer)	Manufacturer specific oating thickness: 40-80 µm		None

Category 5: Aluminium parts

Category 5.1.: Passivation of surface to improve corrosion resistance of untreated aluminum parts.

Holding primer for lacquer and powder coating.

Category	Process	Material	Manufacturer	KAESER part No.
5.1.	Passivation of the aluminium low pressure die-cast iron parts after mechanical processing. Application of manufacturer specific process instructions.	SurTec 650 Chrom(VI)-free passivation for aluminium Coating density: 0,25 g/m²	SurTec Deutschland GmbH SurTec-Str. 2 64673 Zwingenberg	None

Category 5.2.: Masking of color marked surface areas according to drawing to get protection against impurity by lacquer or powder coating.

Category	Process	Material	Manufacturer	KAESER part No.
5.2.	Masking of color marked surface areas	Plugs, caps or other shape adapted parts made of elastomer or plastic.		None

KAESER COMPRESSORS®

Sigma Control Blower Startup Form with and without Kaeser VFD

KAESER AIR SERVICE

Startup Representative:		**Owner:**	
Name:		Name:	
Address:		Address:	
City, State, Zip		City, State, Zip	
Contact Name:		Contact Name:	
Contact Phone:		Contact Phone:	
Email Address:		Email Address:	
Purchase Date:		Type of Business:	
Startup Date:			

Nameplate Data*:

*For blower packages, use the information on the frame data plate.

**Attaching a photo of the nameplate is acceptable.

Package Model: _____ Package Part No.: _____ Serial Number: _____ Package EMR: _____

Communication Module:

EtherNet/IP:	Yes ☐	No ☐
Modbus TCP:	Yes ☐	No ☐
Profinet IO:	Yes ☐	No ☐
Devicenet:	Yes ☐	No ☐
Other (please list):		

Application Data:

Ambient Pressure: ☐
Pipe Inlet Pressure*: ☐
Vacuum Inlet: ☐

Application Type:
Wastewater: ☐
Pneumatic Conveying: ☐
Air Knife / Blow Off: ☐
Other (please list): _____

* Piped inlet: Run blower at full speed with a clean blower filter and clean remote filter. In menu 10.2.4, check box for "Reset Reference Value P"

Ventilation:

Location: Choose One

Room Ventilation Fan:	Yes ☐	No ☐	Capacity:	
Inlet Louvers:	Yes ☐	No ☐	Size:	Qty:
All Piping Insulated:	Yes ☐	No ☐		
Other Equipment in Room:				

*Please include installation sketch on separate page.

Operating Conditions: (Note: If a controller section is mentioned, double check the settings in the SC2)

Altitude (enter 5.2): _____
Inlet Pressure (if piped, set reference p1 in 10.2.1): _____
Discharge Pressure: _____
Operating Differential Pressure _____
Inlet Temperature (menu 10.2.1): Adjust suction temp alarm as needed _____
Outlet Temperature: _____
Differential Temperature:

Control System:

Type of Starter:

STC ☐ Continue to Page 2
OFC ☐ Continue to Page 3
SFC ☐ Continue to Page 4

1. Have you reviewed the maintenance procedures? (Chapter 10 of the Service Manual)	Yes ☐
2. Have you reviewed the warranty policy?	Yes ☐
3. Grease drive motor bearings (if applicable) and review greasing procedures with the owner?	Yes ☐
4. Belts must be retensioned after 24 hours of operation. (Refer to the Service Manual) (Omega Only)	Yes ☐
5. Was the flow display changed to CFM or SCFM?	Yes ☐
6. If remote control, identify error behavior, Menu 11.1 (BUS) or 11.2 (Hardware)	Yes ☐
7. Phase monitor and transformer	Yes ☐

CUSTOMER STATEMENT

I acknowledge that the blower package and accessory equipment supplied by Kaeser Compressors, Inc. has been started, adjusted to factory standards, is functioning correctly, and free from defects. I understand the operation and function of the equipment. The maintenance required to maintain this system in good, safe, working condition has been explained to me. I have read and understand the warranty on this equipment.

Startup Rep.: _____
Print Name: Signature: Date:

Owner: _____
Print Name: Signature: Date:

Technical Notes:

Variable Frequency Drive - Startup Procedure

Package Feeder Circuit

Breaker: *Photos are acceptable

Breaker Rating:
Breaker MFG:
Breaker ID#:
Breaker Amp Setting (FLA x 10)
Breaker Time Delay (min/sec)

Disconnect: *Photos are acceptable

Disconnect Switch Installed: Yes ☐ No ☐
Dual Element (Time Delay) Fuse Rating:
Inverse Time (Time Delay) Breaker Setting:
Dual Element Fuse Rating:
Fuse MFG:

Note: Fused disconnect recommended to secure package SCCR rating

Starter Panel

Things to Check Before Startup:

☐ Check blower oil level (1/2 sight glass while machine is off)
☐ Check machine is level (use 3rd sight glass on screw blower)
☐ Isolation Valves Open
☐ Change flow from m3/min to cfm (5.1 flow rate) *Change to SCFM if desired (5.4.4 - reference-"Standard")

Flow Control:

*Change to SCFM if desired (5.4.4 - reference-"Standard")
External Speed Control
External Variable Control
(Example: Dissolved Oxygen (DO) in PPM)

5.5.1	Decimal Places	2
	Units	ppm
	4mA	0.00 ppm
	20mA	10.00 ppm

5.4.3.1 - Set Value	2.0 ppm
Kp	0.01 rpm/ppm
Ki	0.10 rm/(s/ppm)
Ramp Time	10 s

External Network Setting (Com-Module)

IP Address
Submet Mask
Gateway

Notes:
1. Settings supplied by customer/integrator
2. Input value into target, then click "use IP setting"
3. Make certain to set to "SEND/RECEIVE"

**** assigning fail safe machines
**** assigning error behavior settings

Startup:

Operating Voltage:
Voltage
Ramp Time: seconds (5 to 8 seconds recommended
Phase Hertz *See note A & B below

Main Motor:
Measure phase to phase voltage:
L1 - L2 L2 - L3 L1 - L3
Measure phase to ground voltage:
L1 - PE L2 - PE L3 - PE
Measure line current:
L1 L2 L3

Note: Phase monitoring and transformer can be adjusted for site voltage

A. Phase Monitor Settings:
-if 460V, +/- 10% = 414V to 506V (default)
-if 480V, +/- 10% = 432V to 528V

B. Control Transformer Settings:
-If 460V, Jumper 32-36 (default)
-If 480V, Jumper 38-36

Fan Motor:

Measure phase to phase voltage:
L1 - L2 L2 - L3 L1 - L3
Measure phase to ground voltage:
L1 - PE L2 - PE L3 - PE
Measure line current:
L1 L2 L3

Operation:

Operating Pressure: PSIG or Operating Vacuum: HG
Operating Temperature: °F

Operating Mode (Select mode and complete corresponding section):

Local Mode setting: Choose One

	Control Mode:		
1. Fixed Speed	Set speed		/min
2. Pressure Regulation	Local Set Pressure		psig
	Kp		rpm/psi
	Ki		rpm(psi*s)
	Ramp Time		s
3. External Analog Input (AI signal) 5.5.1	AI1 1.02		
	If yes:	Choose One	Value Type
4. Flow Control (*Change to scfm)	Local Set Value		cfm / scfm
5. External Value Control	Local Set Value		cfm / scfm
6. Other (please explain)			

Return to Page 1 "Startup Review"

Completed forms should be emailed to warranty.us@kaeser.com

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KAESER COMPRESSORS®
Built for a lifetime.

Kaeser Manufacturing Standards

Kaeser Compressors, Inc. is a CE certified manufacturer and ISO is not simply a book we maintain for auditors. ISO is pervasive throughout the company and, whenever possible, our policies and procedures utilize available ISO standards. Conformance to ISO standards is our policy regarding acceptance of the manufactured product.

- All equipment manufacture, documentation, and marking are according to EC Machinery Directive 2006/42/EC.
- Harmonized standards for safety EN 1012-1, Safety requirements for Compressors and ISO 12100-1 /-2, Safety of Machinery.
- Fan wheels are guarded in accordance with EC Machine Directive §1.4 and OSHA recommendations.
- Safety valves are ASME-8 and PED with CE mark.
- Motors comply with 2014/30/EU Directive for Electromagnetic Compatibility.
- Motors provided with pulse spike compatibility to IEC 60034-17 in operation on IGBT frequency converter.
- Air filtration is to EN 779, Class G4
- Omega blower rotors are balanced to ISO 1940/1, G2.5.
- The quality standard for the timing gears is 5F21
- Sound Pressure Level measurement as per ISO 2151 and the basic standard ISO 9614-2, tolerance +/- 3 dB(A).
- Sound Levels provided are guaranteed to be within the tolerances allowed by ISO 2151.
- Performance values provided are guaranteed to be within the tolerances allowed by ISO 1217, Part 1, Annex E Displacement compressors – Acceptance Tests.
- Package vibration is guaranteed to be within the maximum RMS values of the vibration velocity in the two different frequency ranges A and B for Group 4, Resilient Mounting as given in Table 1 of VDI 3836, Measurement and Evaluation of mechanical vibration of screw-type compressors and Root blowers.
- Fully functional machinery like blowers with power stack and control have CE labeling and the declaration of conformity II A.
- Certified to CE and EMC (electro–magnetic compatibility) Class A (industry)

Warranty

KAESER COMPRESSORS®
Built for a lifetime.

Rotary Screw Blowers

Model: _____ **Serial No:** _____ **Start-up Date:** _____

Kaeser Compressors, Inc. herein referred to as "Kaeser," warrants that the Kaeser rotary screw blower and packages manufactured by it and delivered hereunder will be free of defects in material and workmanship for a period of twelve (12) months from date of start-up, not to exceed eighteen (18) months from the date of shipment from Kaeser, whichever occurs first. The screw blower elements are warranted to be free of defects in material and workmanship for a period of twenty-four (24) months from the date of start-up not to exceed thirty (30) months from the date of shipment from Kaeser, whichever occurs first.

Should any failure to conform with the above warranties occur during the specified period under normal use, and the equipment has been proven to Kaeser's satisfaction to have been properly stored, installed and maintained, and purchaser has complied with all procedures outlined in the Kaeser Service Manual, then Kaeser shall, with prompt notice by purchaser, correct such non-conformities at its option either by repair or replacement or by refund of the purchase price of the non-conforming equipment. Return of equipment to such delivery point as Kaeser may direct pursuant to this paragraph shall be at purchaser's risk and expense. Kaeser warrants any equipment repaired or replaced pursuant to the above warranty, under normal use, to be free from defects in workmanship and material for a period of ninety (90) days after the start-up of such repaired or replaced equipment or for a period ending on the expiration of the original equipment warranty, whichever is longer. Unless otherwise expressly agreed, Kaeser shall not be responsible for labor charges, loss or damage resulting from improper operation, maintenance or repairs made by personnel other than those authorized in writing by Kaeser, or damage to equipment caused by the use of non-authorized replacement parts. The effects of corrosion, erosion and normal wear and tear are specifically excluded from Kaeser's warranty.

Repair, replacement or refund (whichever Kaeser determines, in its sole discretion, to provide) shall be Kaeser's sole obligation and purchaser's exclusive remedy for any nonconformity, noncompliance, defect or deficiency in equipment furnished hereunder, and shall be conditioned upon purchaser's return of the defective equipment to Kaeser (DAP Kaeser's directed delivery point), if Kaeser requires such return. This exclusive remedy will not be deemed to have failed of its essential purpose so long as Kaeser is willing to provide repair, replacement or refund. THE EXPRESS WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESSED OR IMPLIED, AND KAESER EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE.

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

Product Warranty Registration

In order for Kaeser Compressors, Inc. to properly handle warranty or other service requests, please register online at us.kaeser.com/warranty.

LIMITATION OF LIABILITY

THE REMEDIES OF THE PURCHASER SET FORTH HEREIN ARE EXCLUSIVE, AND KAESER COMPRESSORS' LIABILITY WITH RESPECT TO EQUIPMENT SOLD HEREUNDER SHALL BE LIMITED TO THE WARRANTY PROVIDED HEREIN AND, WITH RESPECT TO ANY BREACH OF ITS CONTRACT WITH PURCHASER, SHALL BE LIMITED TO THE CONTRACT PRICE OF EQUIPMENT THAT IS THE SUBJECT OF THE BREACH; PROVIDED, HOWEVER, THAT THE FOREGOING SHALL NOT APPLY IN THE EVENT OF ANY ACT THAT CONSTITUTES GROSS NEGLIGENCE OR WILLFUL MISCONDUCT BY THE PARTY SUBJECT TO THE CLAIM FOR SUCH DAMAGES. PRIOR TO PURCHASER HAVING ANY RIGHT TO RECOVER DAMAGES (SUBJECT TO THE LIMITATIONS SET FORTH BELOW), KAESER COMPRESSORS SHALL HAVE THE RIGHT TO CORRECT ANY DEFECT OR NON-CONFORMITY OF ANY EQUIPMENT SOLD HEREUNDER IN A REASONABLE TIME FRAME, AND IF KAESER COMPRESSORS DETERMINES THAT IT IS UNABLE OR UNWILLING TO CORRECT ANY SUCH DEFECT OR NON-CONFORMITY, THEREAFTER, PURCHASER MAY PURSUE THE ALTERNATIVE REMEDIES SET FORTH HEREIN. NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR EXPENSES INCURRED BY THE OTHER PARTY, THE OTHER PARTY'S CUSTOMERS OR ANY THIRD PARTY, WHETHER ARISING FROM BREACH OF CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHER THEORIES OF LAW OR EQUITY, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS OR REVENUE, LOSS OF USE OF EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE FACILITIES OR SERVICES, DOWNTIME COSTS OR CLAIMS OF CUSTOMERS OR SUCH OTHER PARTY FOR SERVICE INTERRUPTION, OR ANY OTHER TYPES OF ECONOMIC LOSS WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.

KAESER COMPRESSORS®

Built for a lifetime.

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us.kaeser.com

KAESER KOMPRESSOREN

Safety Data Sheet

according to Regulation (EC) No 1907/2006

KAESER Sigma Fluid G-680

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

KAESER Sigma Fluid G-680

Further trade names

KAESER-Sigma Fluid G-680, 9.0188.1, 9.0188.10010, 9.0188.10020, 9.0188.10030, 9.0188.10040
KAESER-Sigma Fluid G-680 Silikonfrei, 9.0188.2, 9.0188.20010, 9.0188.20020, 9.0188.20030, 9.0188.20040

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

Use of the substance/mixture

cooling lubricant for rotary screw compressor

Uses advised against

Any non-intended use.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name:	KAESER Kompressoren SE
Street:	Carl- Kaeser- Strasse 26
Place:	D-96450 Coburg
Telephone:	+49(0)9561/640-0
Responsible Department:	sdb.de@kaeser.com

1.4. Emergency telephone number:

Giftinformationszentrum Nord Goettingen + 49 (0) 551 19240 (Poison Information Centre Goettingen)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No. 1272/2008

Hazard categories:
Hazardous to the aquatic environment: Aquatic Chronic 3
Hazard Statements:
Harmful to aquatic life with long lasting effects.

2.2. Label elements

Regulation (EC) No. 1272/2008

Hazard statements

H412	Harmful to aquatic life with long lasting effects.

Precautionary statements

P273	Avoid release to the environment.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Special labelling of certain mixtures

EUH208	Contains N-Phenyl-1-naphthylamine. May produce an allergic reaction. 35 - < 40 % of the mixture consists of ingredient(s) of unknown acute toxicity (inhalation). Contains 35 - < 40 % of components with unknown hazards to the aquatic environment.

2.3. Other hazards

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Hazardous components

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	GHS Classification			
70851-04-6	Decanoic acid, mixed esters with dipentaerythritol, heptanoic acid and octanoic acid			10 - 20 %
	453-480-2		01-0000019168-65	
	Aquatic Chronic 4; H413			
90-30-2	N-Phenyl-1-naphthylamine			0,25 - < 1 %
	201-983-0		01-2119488704-27	
	Acute Tox. 4, Skin Sens. 1B, STOT RE 2, Aquatic Acute 1, Aquatic Chronic 1; H302 H317 H373 H400 H410			
115-86-6	Triphenyl phosphate			0,25 - < 1 %
	204-112-2			
	Aquatic Acute 1, Aquatic Chronic 2; H400 H411			

Full text of H and EUH statements: see section 16.

Specific Conc. Limits, M-factors and ATE

CAS No	EC No	Chemical name	Quantity
	Specific Conc. Limits, M-factors and ATE		
70851-04-6	453-480-2	Decanoic acid, mixed esters with dipentaerythritol, heptanoic acid and octanoic acid	10 - 20 %
	oral: LD50 = >2000 mg/kg		
90-30-2	201-983-0	N-Phenyl-1-naphthylamine	0,25 - < 1 %
	dermal: LD50 = >5000 mg/kg; oral: LD50 = 1625 mg/kg		
115-86-6	204-112-2	Triphenyl phosphate	0,25 - < 1 %
	dermal: LD50 = > 10000 mg/kg; oral: LD50 = > 20000 mg/kg		

Further Information

Product does not contain listed SVHC substances > 0,1 % according to Regulation (EC) No. 1907/2006 Article 59 (REACH)

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

After inhalation

In case of accident by inhalation:
Remove person to fresh air and keep comfortable for breathing. If breathing is irregular or stopped, administer artificial respiration. When in doubt or if symptoms are observed, get medical advice.

After contact with skin

Take off immediately all contaminated clothing. Rinse skin with water/shower. In case of skin irritation, consult a physician.

After contact with eyes

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. In case of eye irritation consult an ophthalmologist.

After ingestion

Rinse mouth immediately and drink plenty of water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person or a person with cramps. When in doubt or if symptoms are observed, get medical advice.

4.2. Most important symptoms and effects, both acute and delayed

After eye contact: No risks worthy of mention.

Inhalation: No risks worthy of mention.
Skin contact: No risks worthy of mention.
ingestion.: No risks worthy of mention.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

In case of fire:
Carbon dioxide (CO2)
Dry extinguishing powder
Foam
In case of major fire and large quantities:
Water spray jet

Unsuitable extinguishing media

High power water jet

5.2. Special hazards arising from the substance or mixture

Can be released in case of fire: Carbon dioxide (CO2). Carbon monoxide. Nitrogen oxides (NOx). Sulfur oxides.

5.3. Advice for firefighters

Wear a self-contained breathing apparatus and chemical protective clothing. In case of fire and/or explosion do not breathe fumes.

Additional information

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water. Use water spray jet to protect personnel and to cool endangered containers.
Co-ordinate fire-fighting measures to the fire surroundings.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures

Avoid contact with skin, eyes and clothes.

For non-emergency personnel

Wear personal protection equipment (refer to section 8).

For emergency responders

No special precautionary measures are necessary.

6.2. Environmental precautions

Do not allow to enter into surface water or drains. Prevent spread over a wide area (e.g. by containment or oil barriers).
Cover drains.

6.3. Methods and material for containment and cleaning up

For containment

Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).
Treat the recovered material as prescribed in the section on waste disposal.

For cleaning up

Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Safe handling: see section 7
Personal protection equipment: see section 8
Disposal: see section 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Do not breathe vapour/aerosol. Avoid contact with skin, eyes and clothes.
Wear personal protection equipment (refer to section 8).

Advice on protection against fire and explosion

Usual measures for fire prevention.

Further information on handling

Advices on general occupational hygiene: See section 8.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep container tightly closed and in a well-ventilated place.
Keep only in original container.
Make sure spills can be contained, e.g. in sump pallets or kerbed areas.
Suitable material for Container: Steel. Polyethylene (HDPE).
Unsuitable materials for Container: PVC (Polyvinyl chloride).

Hints on joint storage

Do not store together with: Gas. Explosive hazardous substances. Oxidising substances (solid). Oxidising substances (liquid) Radioactive substances. Infectious substances.
Keep away from food, drink and animal feedingstuffs.

Further information on storage conditions

Protect against: UV-radiation/sunlight.. Heat.

7.3. Specific end use(s)

refer to section 1.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits (EH40)

CAS No	Substance	ppm	mg/m³	fibres/ml	Category	Origin
115-86-6	Triphenyl phosphate	-	3		TWA (8 h)	WEL
		-	6		STEL (15 min)	WEL

DNEL/DMEL values

CAS No	Substance			
DNEL type		Exposure route	Effect	Value
90-30-2	N-Phenyl-1-naphthylamine			
Worker DNEL, long-term		dermal	systemic	0,05 mg/kg bw/day
Worker DNEL, long-term		inhalation	systemic	0,18 mg/m³
Consumer DNEL, long-term		dermal	systemic	0,03 mg/kg bw/day
Consumer DNEL, long-term		inhalation	systemic	0,044 mg/m³
Consumer DNEL, long-term		oral	systemic	0,03 mg/kg bw/day

PNEC values

CAS No	Substance
Environmental compartment	Value
90-30-2	N-Phenyl-1-naphthylamine
Freshwater	0 mg/l
Marine water	0 mg/l
Freshwater sediment	0,034 mg/kg
Marine sediment	0,003 mg/kg
Micro-organisms in sewage treatment plants (STP)	100 mg/l
Soil	0,007 mg/kg

Additional advice on limit values

Air limit values:
Possibility of exposure to Aerosol (Mineral oil)
Limit value (TLV-TWA) = 5 mg/m3 - Source: ACGIH
Limit value (TLV-STEL) = 10 mg/m3 - Source: ACGIH

STEL: short-term exposure limits
TLV: Threshold Limiting Value
TWA: time weighted average
ACGIH: American Conference of Governmental Industrial Hygienists

Recommended monitoring procedures:
DIN-/EN-Norms: EN 689, EN 14042, EN 482

8.2. Exposure controls

Appropriate engineering controls

Vapours / aerosols should be extracted by suction directly at point of origin.

Protective and hygiene measures

Always close containers tightly after the removal of product. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work. Take off contaminated clothing.
Do not put any product-impregnated cleaning rags into your trouser pockets.

Eye/face protection

Recommended eye protection articles: Eye glasses with side protection. BS/EN 166

Hand protection

In case of prolonged or frequently repeated skin contact: Wear suitable gloves. BS EN 374
Suitable material: NBR (Nitrile rubber). CR (polychloroprene, chloroprene rubber)
Thickness of the glove material: 0,35 mm
Breakthrough time > 480 min.
Check leak tightness/impermeability prior to use. Breakthrough times and swelling properties of the material must be taken into consideration.

Skin protection

Protective clothing.
Minimum standard for preventive measures while handling with working materials are specified in the TRGS 500.

Respiratory protection

With correct and proper use, and under normal conditions, breathing protection is not required.
Respiratory protection necessary at:

Generation/formation of aerosols
Recommended respiratory protection articles: Combination filtering device (EN 14387). Type: AP-2/3
The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used.
Observe the wear time limits according GefStoffV in combination with the rules for using respiratory protection apparatus (BGR 190).

Environmental exposure controls

Do not allow uncontrolled discharge of product into the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	Liquid
Colour:	Clear, yellow
Odour:	Not determined

	Test result	Test method
pH-Value:	Not determined	Not applicable
Changes in the physical state		
Melting point:	Not determined	Not applicable
Boiling point or initial boiling point and boiling range:	Not determined	Not applicable
Pour point:	Not determined	Not applicable
Flash point:	280 °C	Not determined
Sustaining combustion:	No data available	Not applicable
Flammability		
Solid/liquid:	Not applicable	
Gas:	Not applicable	
Explosive properties		
none		
Lower explosion limits:	Not determined	
Upper explosion limits:	Not determined	
Auto-ignition temperature:	Not determined	Not applicable
Self-ignition temperature		
Gas:	Not determined	
Decomposition temperature:	Not determined	Not applicable
Oxidizing properties		
none		
Vapour pressure: (at 25 °C)	Not determined	-
Vapour pressure:		
Density (at 15 °C):	Not determined	Not applicable
Bulk density:	Not determined	
Water solubility:	Immiscible	Not applicable
Solubility in other solvents		
Not determined		
Partition coefficient n-octanol/water:	The product has not been tested.	
Viscosity / dynamic:	Not determined	Not applicable

Viscosity / kinematic: (at 40 °C)	64,9 mm²/s	Not determined
Flow time:	Not determined	Not applicable
Relative vapour density:	Not determined	Not applicable
Evaporation rate:	Not determined	Not applicable
Solvent separation test:	Not determined	
Solvent content:	Not determined	

9.2. Other information

Solid content: Not determined

SECTION 10: Stability and reactivity

10.1. Reactivity

No information available.

10.2. Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature.

10.3. Possibility of hazardous reactions

Reacts with : Oxidizing agents, strong.

10.4. Conditions to avoid

UV-radiation/sunlight. Heat

10.5. Incompatible materials

Oxidizing agents, strong. Strong acid. Strong alkali.

10.6. Hazardous decomposition products

Can be released in case of fire: Carbon dioxide (CO_2). Carbon monoxide. Nitrogen oxides (NOx). Sulfur oxides.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Toxicocinetics, metabolism and distribution

No information available.

Acute toxicity

Based on available data, the classification criteria are not met.

CAS No	Chemical name					
	Exposure route	Dose		Species	Source	Method
70851-04-6	Decanoic acid, mixed esters with dipentaerythritol, heptanoic acid and octanoic acid					
	oral	LD50 mg/kg	>2000	Rat	ECHA Dossier	
90-30-2	N-Phenyl-1-naphthylamine					
	oral	LD50 mg/kg	1625	Rat.	ECHA Dossier	
	dermal	LD50 mg/kg	>5000	Rabbit	ECHA Dossier	
115-86-6	Triphenyl phosphate					
	oral	LD50 mg/kg	> 20000	Rat	ECHA Dossier	OECD Guideline 401
	dermal	LD50 mg/kg	> 10000	Rabbit	ECHA Dossier	OECD Guideline 402

Irritation and corrosivity

Based on available data, the classification criteria are not met.
Triphenyl phosphate:
Irritant effect on the skin:
Species: Rabbit; Exposure time: 4h; Method: OECD 404; Result: negative.
Irritant effect on the eye: Species: Rabbit; Method: OECD 405; Result: negative.
N-Phenyl-1-naphthylamine:
Irritant effect on the eye:
Species: Rabbit; Method: OECD 405; Result negative.; Literature information: ECHA Dossier

Sensitising effects

Contains N-Phenyl-1-naphthylamine. May produce an allergic reaction.
N-Phenyl-1-naphthylamine:
Species: Guinea-pig. Result: positive. Literature information: ECHA Dossier
Triphenyl phosphate:
Species: Guinea-pig. Result: negative. Method: OECD 406

Carcinogenic/mutagenic/toxic effects for reproduction

Based on available data, the classification criteria are not met.
N-Phenyl-1-naphthylamine:
In-vitro mutagenicity:
Method: OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
Result negative.; Literature information: ECHA Dossier
Carcinogenicity: Evidence for human carcinogenicity. International Programme on Chemical Safety's Concise International Chemical Assessment Documents. Number 9: N-Phenyl-1-naphthylamine (1998). Available from, as of July 26, 2004: http://www.inchem.org/documents/cicads/cicads/cicad9.htm
Triphenyl phosphate: In-vitro mutagenicity: Ames test negative.

STOT-single exposure

Based on available data, the classification criteria are not met.

STOT-repeated exposure

Based on available data, the classification criteria are not met.
N-Phenyl-1-naphthylamine:
Subacute oral toxicity:
Method: OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents); Species: Rat
Result: NOAEL = 80 mg/kg; Literature information: ECHA Dossier

Aspiration hazard

Based on available data, the classification criteria are not met.

Specific effects in experiment on an animal

There are no data available on the preparation/mixture itself.

11.2. Information on other hazards

Endocrine disrupting properties

No information available.

SECTION 12: Ecological information

12.1. Toxicity

CAS No	Chemical name						
	Aquatic toxicity	Dose		[h] | [d]	Species	Source	Method
90-30-2	N-Phenyl-1-naphthylamine						
	Acute fish toxicity	LC50	0,44 mg/l	96 h	Oncorhynchus mykiss	ECHA Dossier	
	Acute crustacea toxicity	EC50	0,3 mg/l	48 h	Daphnia magna	ECHA Dossier	
	Crustacea toxicity	NOEC	0,02 mg/l	21 d	Daphnia magna	ECHA Dossier	

115-86-6	Triphenyl phosphate						
	Acute fish toxicity	LC50	0,4 mg/l	96 h	Oncorhynchus mykiss	ECHA Dossier	
	Acute algae toxicity	ErC50	2,45 mg/l	72 h	Pseudokirchneriella subcapitata	ECHA Dossier	OECD Guideline 201
	Acute crustacea toxicity	EC50	1 mg/l	48 h	Daphnia magna	ECHA Dossier	
	Fish toxicity	NOEC mg/l	0,037	30 d	Oncorhynchus mykiss	ECHA Dossier	EPA-660/3-75-009
	Crustacea toxicity	NOEC mg/l	0,254	21 d	Daphnia magna	ECHA Dossier	OECD Guideline 211

12.2. Persistence and degradability

CAS No	Chemical name			
	Method	Value	d	Source
	Evaluation			
70851-04-6	Decanoic acid, mixed esters with dipentaerythritol, heptanoic acid and octanoic acid			
	-	79 %	28	ECHA Dossier
	Easily biodegradable (concerning to the criteria of the OECD)			
90-30-2	N-Phenyl-1-naphthylamine			
	OECD 301C / ISO 9408 / EEC 92/69 annex V, C.4-F	0 %	28	ECHA Dossier
	Not easily bio-degradable (according to OECD-criteria).			
115-86-6	Triphenyl phosphate			
	OECD 301C / ISO 9408 / EEC 92/69 annex V, C.4-F	83-94 %	28	ECHA Dossier
	Easily biodegradable (concerning to the criteria of the OECD)			

12.3. Bioaccumulative potential

No information available.

Partition coefficient n-octanol/water

CAS No	Chemical name	Log Pow
70851-04-6	Decanoic acid, mixed esters with dipentaerythritol, heptanoic acid and octanoic acid	> 6,2
90-30-2	N-Phenyl-1-naphthylamine	4,28
115-86-6	Triphenyl phosphate	4,63

BCF

CAS No	Chemical name	BCF	Species	Source
90-30-2	N-Phenyl-1-naphthylamine	427 - 2,730	Cyprinus carpio	ECHA Dossier
115-86-6	Triphenyl phosphate	144	Oryzias latipes	ECHA Dossier

12.4. Mobility in soil

No information available.

12.5. Results of PBT and vPvB assessment

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6. Endocrine disrupting properties

No information available.

12.7. Other adverse effects

No information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal recommendations

Dispose of waste according to applicable legislation. Consult the local waste disposal expert about waste

disposal. Non-contaminated packages may be recycled. According to (EWC) European Waste Catalogue, allocation of waste identity numbers/waste descriptions must be carried out in a specific way for every industry and process. Waste codes/waste designations according to (EWC) European Waste Catalogue.

List of Wastes Code - residues/unused products

130206 OIL WASTES AND WASTES OF LIQUID FUELS (EXCEPT EDIBLE OILS, AND THOSE IN CHAPTERS 05, 12 AND 19); waste engine, gear and lubricating oils; synthetic engine, gear and lubricating oils; hazardous waste

List of Wastes Code - used product

130206 OIL WASTES AND WASTES OF LIQUID FUELS (EXCEPT EDIBLE OILS, AND THOSE IN CHAPTERS 05, 12 AND 19); waste engine, gear and lubricating oils; synthetic engine, gear and lubricating oils; hazardous waste

List of Wastes Code - contaminated packaging

150110 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); packaging containing residues of or contaminated by hazardous substances; hazardous waste

Contaminated packaging

Handle contaminated packages in the same way as the substance itself.

SECTION 14: Transport information

Land transport (ADR/RID)

14.1. UN number:	No dangerous good in sense of these transport regulations.
14.2. UN proper shipping name:	No dangerous good in sense of these transport regulations.
14.3. Transport hazard class(es):	No dangerous good in sense of these transport regulations.
14.4. Packing group:	No dangerous good in sense of these transport regulations.

Inland waterways transport (ADN)

14.1. UN number:	No dangerous good in sense of these transport regulations.
14.2. UN proper shipping name:	No dangerous good in sense of these transport regulations.
14.3. Transport hazard class(es):	No dangerous good in sense of these transport regulations.
14.4. Packing group:	No dangerous good in sense of these transport regulations.

Marine transport (IMDG)

14.1. UN number:	No dangerous good in sense of these transport regulations.
14.2. UN proper shipping name:	No dangerous good in sense of these transport regulations.
14.3. Transport hazard class(es):	No dangerous good in sense of these transport regulations.
14.4. Packing group:	-

Air transport (ICAO-TI/IATA-DGR)

14.1. UN number:	No dangerous good in sense of these transport regulations.
14.2. UN proper shipping name:	No dangerous good in sense of these transport regulations.
14.3. Transport hazard class(es):	No dangerous good in sense of these transport regulations.
14.4. Packing group:	-

14.5. Environmental hazards

ENVIRONMENTALLY HAZARDOUS: No

14.6. Special precautions for user

See section 8.

14.7. Maritime transport in bulk according to IMO instruments

Not relevant

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulatory information

Restrictions on use (REACH, annex XVII):

Entry 3

2010/75/EU (VOC):	Not determined
2004/42/EC (VOC):	Not determined
Information according to 2012/18/EU (SEVESO III):	Not subject to 2012/18/EU (SEVESO III)

Additional information

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (amended by Regulation (EU) No 2020/878)
The mixture is classified as hazardous according to regulation (EC) No 1272/2008 [CLP].
REACH 1907/2006 appendix XVII: 3 (Mixtures)

National regulatory information

Employment restrictions:	Observe restrictions to employment for juveniles according to the 'juvenile work protection guideline' (94/33/EC).
Water hazard class (D):	2 - obviously hazardous to water

Additional information

Approval according to USDA H1/NSF, registry number -

15.2. Chemical safety assessment

For the following substances of this mixture a chemical safety assessment has been carried out:
N-Phenyl-1-naphthylamine

SECTION 16: Other information

Changes

Rev. 3.0; 31.03.2017. Initial release.
Rev. 4.0; 15.02.2021. Changes in chapter: 2, 3, 6, 8, 11, 12, 15, 16

Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
CAS Chemical Abstracts Service
CLP: Classification, Labelling and Packaging of substances and mixtures
DNEL: Derived No Effect Level
d: day(s)
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European LIst of Notified Chemical Substances
ECHA: European Chemicals Agency
EWC: European Waste Catalogue
IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
GefStoffV: Gefahrstoffverordnung (Ordinance on Hazardous Substances, Germany)
h: hour
LOAEL: Lowest observed adverse effect level
LOAEC: Lowest observed adverse effect concentration

LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
NOAEL: No observed adverse effect level
NOAEC: No observed adverse effect concentration
NLP: No-Longer Polymers
N/A: not applicable
OECD: Organisation for Economic Co-operation and Development
PNEC: predicted no effect concentration
PBT: Persistent bioaccumulative toxic
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer
REACH: Registration, Evaluation, Authorisation of Chemicals
SVHC: substance of very high concern
TRGS: Technische Regeln für Gefahrstoffe
UN: United Nations
VOC: Volatile Organic Compounds

Classification for mixtures and used evaluation method according to Regulation (EC) No. 1272/2008 [CLP]

Classification	Classification procedure
Aquatic Chronic 3; H412	Calculation method

Relevant H and EUH statements (number and full text)

H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.
EUH208	Contains N-Phenyl-1-naphthylamine. May produce an allergic reaction.

Further Information

Classification according to Regulation (EC) No 1272/2008 [CLP] - Classification procedure:
Health hazards: Calculation method.
Environmental hazards: Calculation method.
Physical hazards: On basis of test data and / or calculated and / or estimated.

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)

ExxonMobil

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **UNIREX N 3**
Product Description: Base Oil and Additives
Product Code: 2015A0207230, 644369-00, 97N712
Intended Use: Grease

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX 77389 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	www.exxon.com, www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
1-NAPHTHYLAMINE, N-PHENYL-	90-30-2	0.1 - < 1.0%	H302, H317, H373, H400(M factor 1), H410(M factor 1)
BENZOIC ACID, 2-HYDROXY-, MONOLITHIUM SALT	552-38-5	1 - < 5%	H302, H314(1)
DILITHIUM SALICYLATE	38970-76-2	1 - < 5%	H302, H314(1B)
DINONYL NAPHTHALENESULFONIC ACID, BARIUM SALT	25619-56-1	0.1 - < 1%	H302, H315
LITHIUM HYDROXIDE	1310-65-2	0.1 - < 1%	H302, H314(1B)
LITHIUM METABORATE	13453-69-5	0.1 - < 1%	H318, H361(D)

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: >200°C (392°F) [EST. FOR OIL, ASTM D-92 (COC)]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Scrape up spilled material with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard			NOTE	Source
DINONYL NAPHTHALENESULFONIC ACID, BARIUM SALT [as Ba]		TWA	0.5 mg/m3		N/A	OSHA Z1
DINONYL NAPHTHALENESULFONIC ACID, BARIUM SALT [as Ba]		TWA	0.5 mg/m3		N/A	ACGIH
LITHIUM HYDROXIDE		Ceiling	1 mg/m3		N/A	OARS WEEL
LITHIUM METABORATE	Inhalable fraction.	STEL	6 mg/m3		N/A	ACGIH
LITHIUM METABORATE	Inhalable fraction.	TWA	2 mg/m3		N/A	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Solid
Form: Semi-fluid
Color: Green
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.92
Flammability (Solid, Gas): N/A
Flash Point [Method]: >200°C (392°F) [EST. FOR OIL, ASTM D-92 (COC)]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: N/D
Decomposition Temperature: N/D
Vapor Density (Air = 1): N/D
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 112.75 cSt (112.75 mm2/sec) at 40 °C [Base oil]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/D
DMSO Extract (mineral oil only), IP-346: < 3 %wt

NOTE: Most physical properties above are for the oil component in the material.

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for	Minimally Toxic. Based on assessment of the components.

material.	
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 431 439
Eye	
Serious Eye Damage/Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 437 492
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
1-NAPHTHYLAMINE, N-PHENYL-	Oral Lethality: LD50 1625 mg/kg (Rat)
DILITHIUM SALICYLATE	Oral Lethality: LD50 550 mg/kg (Rat)
DINONYL NAPHTHALENESULFONIC ACID, BARIUM SALT	Oral Lethality: LD50 1750 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components, this formulation, or similar formulations.

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

N-phenyl-1-naphthylamine (PAN): A single oral overexposure may result in clinical signs/symptoms of cyanosis, headache, shallow respiration, dizziness, confusion, low blood pressure, convulsions, coma, or jaundice. Hematuria may occur due to bladder and kidney irritation, and anemia may develop later. Repeated exposure in laboratory animals caused liver and kidney damage and depressed bone marrow activity. Undiluted PAN is a skin sensitizer. Human testing of lubricants containing 1.0% PAN resulted in no reactions indicative of sensitization.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for similar materials

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised

incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics:
TCLP (BARIUM)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: DSL, IECSC, TCSI, TSCA

Special Cases:

Inventory	Status
AICS	Restrictions Apply
KECI	Restrictions Apply

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

SARA (311/312) REPORTABLE GHS HAZARD CLASSES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
LITHIUM METABORATE	13453-69-5	1

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H314(1): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1
H314(1B): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1B
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H317: May cause allergic skin reaction; Skin Sensitization, Cat 1
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Section 11: Dermal Irritation Test Comment information was modified.
Section 11: Dermal Irritation Test Data information was modified.
Section 11: Eye Irritation Test Comment information was modified.
Section 11: Eye Irritation Test Data information was modified.
Section 11: Eye Irritation Test Guideline information was added.
Section 11: Skin Irritation Test Guideline information was added.
Section 15: Special Cases Table information was modified.

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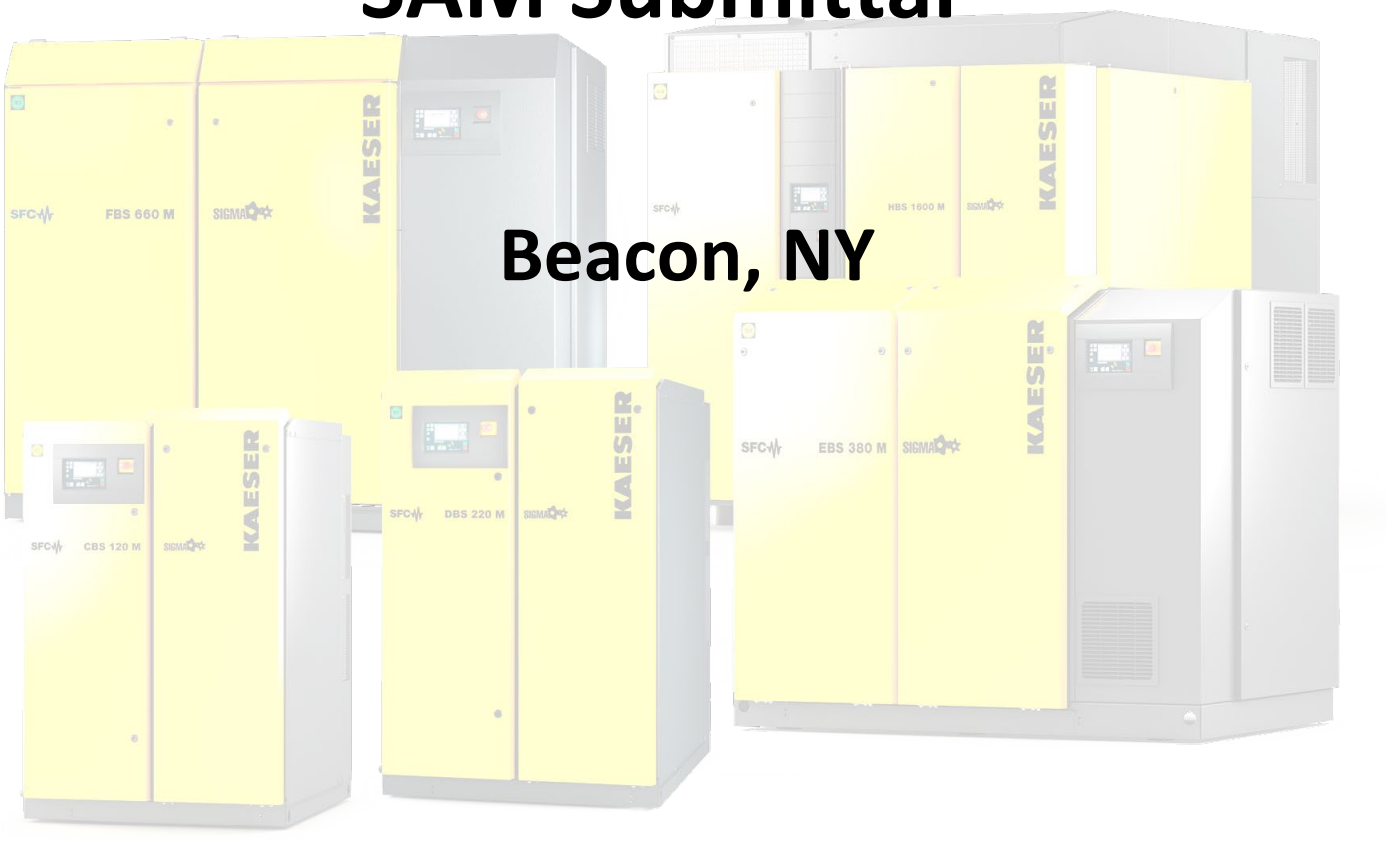
Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2025681XUS (553419)

KAESER COMPRESSORS®

SAM Submittal



Beacon, NY

Kaeser District Manager
Travis Snead
travis.snead@kaeser.com
(804) 402-6340

KAESER COMPRESSORS®

Built for a lifetime.

Compressed Air Management System

SIGMA AIR MANAGER® 4.0

Compressed air station core intelligence

kaeser.com

SIGMA AIR MANAGER® 4.0

Optimum efficiency

Adaptive, efficient and networked: demand-oriented compressed air management takes on a whole new meaning with the SIGMA AIR MANAGER 4.0. This advanced controller coordinates operation of multiple compressors and dryers, blowers or vacuum pumps. Our patented simulation-based optimization process calculates future demand based on past compressed air consumption profiles and dynamic real time response to create a superior combination of reliable flow and pressure with low energy usage. Comprehensive monitoring and predictive maintenance are made possible via the secure KAESER SIGMA NETWORK to minimize downtime.

Monitoring and reporting

The SIGMA AIR MANAGER (SAM) 4.0 enables comprehensive compressed air station monitoring through the recording, archiving and visualization of operating data. Complete station parameter tracking means that faults can be detected early and rectified immediately. Moreover, the SAM 4.0 actively supports energy management in accordance with ISO 550001. The necessary figures and data are automatically output, evaluated and made available as a report.

Availability and maintenance

The SIGMA AIR MANAGER 4.0 provides active support for organization of service activities. Compressed air station operating data are recorded, which ensures a permanent overview of system maintenance status. Service intervals can therefore be planned and optimized from a future-forward perspective. In addition, all plain text messages from the connected compressors can be viewed in the message history, making it easy to track system status at any time.

Networking and communication

The SIGMA AIR MANAGER 4.0 enables complete compressed air station digitalization. As the central node point, it connects all station components via the secure KAESER SIGMA NETWORK. Operating data from compressors, dryers, blowers, vacuum pumps and KAESER Measurement Technology sensors are collected centrally and can be integrated into the existing control technology. The advantage? Information is exchanged in real-time to assure continuous energy and cost optimization combined with seamless production flow.

Capacity and utilization

The SIGMA AIR MANAGER 4.0 is designed to grow with your compressed air station. A simple software upgrade allows expansion of the master controller without the need for additional investment in new hardware. Therefore, with a software upgrade, a SAM 4.0 initially capable of controlling only up to four compressors can be updated to control up to eight, or even sixteen, compressors. Accordingly, capacity can easily be adapted to suit actual requirement.

User-friendly operation

Advanced, capacitive touch technology, offset supplementary keys and durable LED illumination make the SIGMA AIR MANAGER 4.0 an exceptionally user-friendly tool, and not just on the haptic level, but also on a global one, since it supports 34 languages.

What's on the inside. What's in it for you.

KAESER SIGMA NETWORK

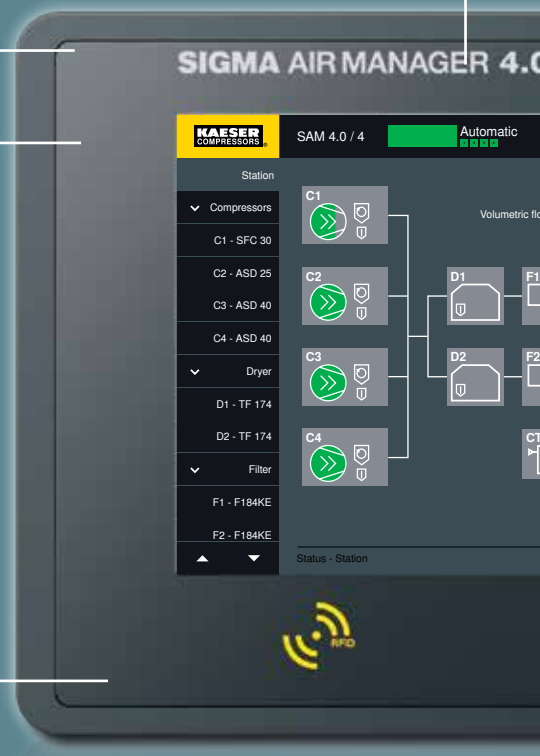
Safe and secure network.

All of the compressor station's components can be seamlessly integrated into the KAESER SIGMA NETWORK.

Upgrade your compressed air system

Future-dynamic: SIGMA AIR MANAGER 4.0 grows with you.

A simple software upgrade is all that's required to expand your compressed air system to meet future demand. Software updates ensure constant optimization.



Adaptive 3D^{advanced} Control

Optimum efficiency.

With the patented simulation-based optimization process, you can achieve the most efficient performance solution from various potential options. The result? More compressed air for less energy.

RFID card

Secure login.

The integrated RFID interface ensures secure login for authorized personnel - without the need for passwords.

Live P&I diagram

Everything at a glance.

Your entire compressed air station represented as a flow diagram on a 12-inch display, or on your computer and network-compatible devices.

Industrial Internet of Things (IIOT)

Communication & data exchange in real-time.

The SIGMA AIR MANAGER 4.0 master controller allows KAESER to take full advantage of the very latest digital information technology and provides complete component networking capability. The advantage: real-time data exchange for continuous optimization of energy and costs, combined with seamless production flow.

Energy management per ISO 50001

Your energy report quickly and easily.

The SIGMA AIR MANAGER 4.0 is your perfect partner for operating data storage and provides data in accordance with ISO 50001.

Variable bus communication

All common interfaces.

All common interfaces are available with the help of the optional plug-in communication module.

Always connected with KAESER: Ethernet/IP™, – OPC UA, either option available. We have tomorrow's needs covered too.

Thanks to Plug & Play, the future is just a plug-in connection away.

KAESER CONNECT

Operation, consumption and cost overview. Anytime, anywhere.

All operational and energy consumption data, as well as cost information, can be called up on any network-compatible device anytime, anywhere.

SIGMA AIR MANAGER® 4.0

Maintenance / availability

In order to simplify system maintenance, the SIGMA AIR MANAGER 4.0 menu has been expanded to include a “Maintenance” section. This new function allows you to view the maintenance hours counters for the compressors. Counter readings can be called up live, or sent by means of an automatically generated report.

This facilitates predictive planning of maintenance tasks at a time convenient to your processes. The SIGMA AIR MANGER 4.0 always loads compressors within a maintenance group evenly, which also has the beneficial effect of ensuring that the maintenance hours for the corresponding systems are evenly distributed. This means that maintenance can be performed on these systems on the same day, or as one job. Maintenance measures can therefore be planned more easily and can be scheduled for non-operating times.

Furthermore, all plain text messages for compressors connected via the SIGMA NETWORK can be viewed in the message history, making it easy to track system status at any time.


SIGMA AIR MANAGER 4.0
KAESER COMPRESSORS
SAM 4.0 / 4
Mode manual
115 psi
EN
Station
Compressors
C1 - SFC 30
C2 - ASD 25
C3 - ASD 40
C4 - ASD 40
Dryer
D1 - TF 174
D2 - TF 174
Filter
F1 - F184KE
F2 - F184KE
Oil filter in 450h 3000h
Air filter in 150h 3000h
Oil separator in 33h 3000h
Belt/coupling inspection in 66h 35000h
Oil change in 112h 3000h
Electric equipment in 277h 36000h
Bearing lube in 527h 36000h
Valves in 2500h 36000h
Bearing change in 2527h 12000h
Group maintenance in 7058h 8550h
Estimated due date for next service measure:
25.12.2020
Maintenance - Overview
Status
Messages
Monitoring
Energy & Costs
Maintenance
Control
Time Control
Initial Start-up
Configuration
Contact
www.kaeser.com
RFID
24/7 SUPPORT

SIGMA AIR MANAGER® 4.0

Energy costs and reporting

Systematic energy management increases the efficiency of the entire compressed air station, thereby reducing both energy consumption and the associated greenhouse gas emissions. This maximized efficiency is reflected in minimized costs.

The SIGMA AIR MANAGER 4.0 from KAESER COMPRESSOR records, archives and processes the station's operating data and actively supports you with your energy management activities as per ISO 50001. The required key figures – such as delivery volume, specific package input power and energy consumption – are automatically provided at a freely selectable time interval. This enables comprehensive energy performance analysis.

Evaluation of the collected data is sent to a mobile phone, laptop or tablet for browser-based viewing. The SIGMA AIR MANAGER 4.0 automatically creates the reports required for ISO 50001 certification, thereby providing comprehensive documentation relating to energy savings.

The reports are directly available via KAESER CONNECT and it is also possible to have all relevant information automatically sent to you by email. Furthermore, the CSV data download guarantees individual subsequent processing of the measurement data.

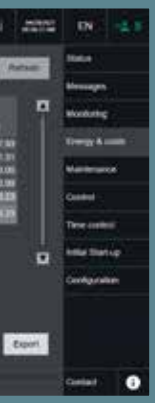
Energy data at a glance

Data preselection allows you to view all key information quickly and easily.

Accessible anytime, anywhere via KAESER CONNECT.

View time periods individually

Would you like to compare individual days, weeks or any period of time? No problem – the SIGMA AIR MANAGER 4.0 takes care of it.



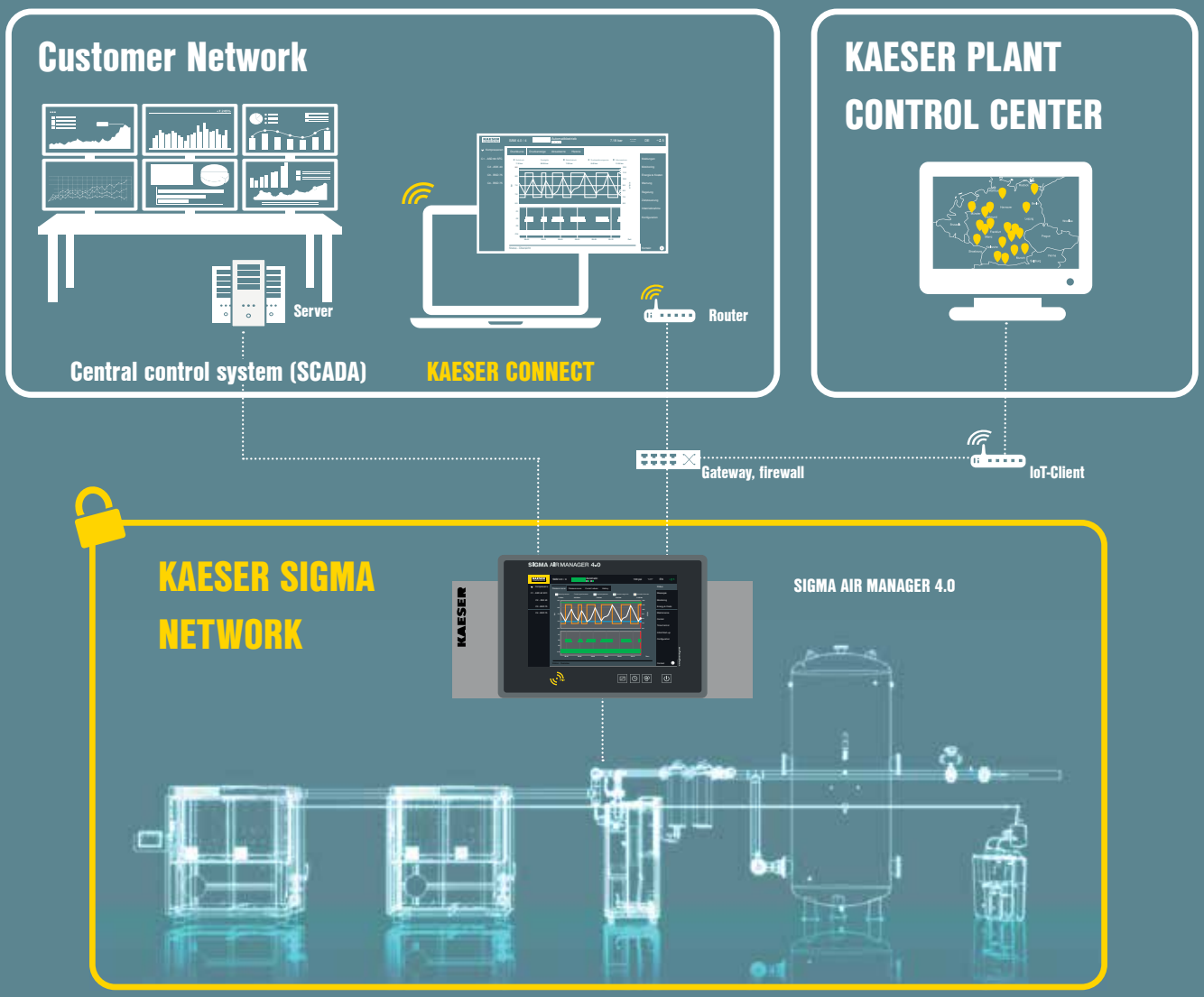
Priorities in focus

Clear menu layout ensures intuitive navigation to provide a comprehensive overview of your compressed air system with maximum ease.

Data processing

Tailored range of services

Tailored to your exact needs, the SIGMA AIR MANAGER 4.0 from KAESER includes everything you need for smooth and efficient operation of your compressed air station.



SIGMA AIR MANAGER® 4.0

Communication / networking

Compressed air station digitalization enhances efficiency and increases reliability. Because all station components are in constant communication with each other, any performance deviations can be detected at an early stage and be addressed as necessary. The SIGMA AIR MANAGER 4.0 connects every component within the compressed air station – including external components – via the secure, IP-based KAESER SIGMA NETWORK.

As the central node point, it gathers the individual operating data and forwards them to mobile phones, laptops or tablets for browser-based viewing via KAESER CONNECT. This not only provides you with comprehensive station monitoring, but also enables operating data to be integrated into existing control technology. Flexible interface modules ensure easy on-site plug and play connection, which means that you always have excellent oversight of your production process and can react in good time as needed.

Monitoring

Comprehensive monitoring of your compressed air station saves you both time and money, since any deviation that remains undetected can quickly become an issue. Even small changes can result in increased energy consumption and higher maintenance costs.

The SIGMA AIR MANAGER 4.0 from KAESER COMPRESSOR records, archives and visualizes the operating data for every component in the compressed air station that is connected to the SIGMA NETWORK. This enables comprehensive monitoring of station parameters, both in real-time and over an extended period. The ability to export measurement values as a CSV (Comma-Separated Values) file makes evaluation simple.

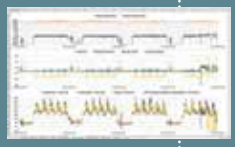
Fault messages can be sent to a laptop, mobile phone or tablet for browser-based viewing. This allows any faults to be identified in good time and resolved immediately, ensuring efficient and reliable compressed air station operation.

Display of possible fault messages

Forwarding to browser-based devices

Compressed air station monitoring

Export of measurement values as a CSV file



Analysis of measurement values

Applying SIGMA AIR MANAGER 4.0

SAM 4.0 is your round-the-clock compressed air expert—a simple solution to ensure optimum performance and record detailed information to determine your operational decisions.

Compressed air usage frequently changes in the dynamic production environment and simply purchasing efficient compressors won't ensure long term efficiency and reliability. A master controller is necessary to continually optimize the operation of the compressors. Further, compressed air is one of your largest utility costs yet, you probably have very little detail on how it is used and how efficiently you are creating it. With SAM 4.0, you have detailed data on your use of compressed air and the cost of making it. SAM 4.0 gives you insight into the ongoing energy costs that you can tie to production costs overall. Without the SAM 4.0, it is easy to lose sight of the high cost of compressed air and how production changes have impacted your system performance.

Benefits of Applying SAM 4.0

1. Reduce the initial costs for new projects and expansions by up to 20%.
2. Increase the productivity of your facility by creating greater flexibility and lowering redundancy costs.
3. Provide real time monitoring of your system both locally and remotely.
4. Provide detailed historical air demand information allowing for simple and accurate expansion planning as well as operating cost changes.

Optimizing system design with SAM 4.0

Reduce initial costs and increase productivity: SAM 4.0 eliminates the need for costly frequency drive compressors to provide peak efficiency. A SAM 4.0 installation replaces single large unit systems with multiple smaller unit systems providing for greater productivity, inherent redundancy and lower costs for expansion.

Reduce operational costs: SAM 4.0 manages both the flow and pressure of your system. This allows you to operate your system at the minimum pressure necessary to meet the demands of production. Operational costs are saved as compressors operate more efficiently at lower pressure, and artificial demand from leaks and unregulated uses are reduced.

Real time monitoring: The connectivity options available with a SAM 4.0 installation allows for real time system monitoring and evaluation of alarms from any authorized laptop. One key advantage to this feature is the ability to diagnose issues remotely reducing the frequency of late night trips back to your facility.

Historical performance: The detailed information the SAM 4.0 provides you will allow for more knowledgeable decision-making. For example:

- Changes in production and their effect on compressed air consumption and costs. Are there expensive inappropriate uses of compressed air? How has your compressed air leak load changed over time?
- Allocation of unit production costs. Generally compressed air is the single largest contributor to your overall energy costs, yet without SAM 4.0, it's difficult to track your real costs. Knowing how your compressed air system changes when production changes can help you better allocate costs within your organization.

How SAM 4.0 reduces costs

System Design	Option 1: Single 125 hp Variable Frequency Drive Compressor	Option 2: 2 x 60 hp Fixed Speed Compressors with SAM 4.0	Option 3: 75 hp Variable Frequency Drive and 40 hp Fixed Speed Compressors with SAM 4.0
Annual Energy Cost (1)	$45,444	$49,492	**$44,239**
Peak Power	93.74 kW	95.97 kW	**89.73 kW**
System Specific Power	17.60 kW/100 cfm	19.21 kW/100 cfm	**17.14 kW/100 cfm**
Footprint (2)	**348 ft²**	425 ft²	415 ft²
Recommended System Storage(3)	3,000 gal.	**1,440 gal.**	1,775 gal.
Equipment Cost	$90,000	**$75,000**	$90,000
Redundancy (4)	0%	**50%**	30%
Cost for Growth or Backup (5)	$90,000	**$34,000**	$55,000
Annual Parts Cost (6)	$4,000	**$2,100**	$4,825
5-Year Life Cycle Cost	$337,220	**$332,960**	$335,318

(1) Assuming a typical industrial compressed air system with a max flow of 500 cfm, average of 280 cfm and minimum flow of 125 cfm. Operating 24/7 at 100 psig with a power cost of $0.10/kWh.

(2) Footprint: Includes the necessary area for compressors, storage, air treatment, and ventilation with sufficient clearance for maintenance.

(3) Recommended system storage: Based on the Compressed Air Challenge guideline of 5 gallons per cfm of the largest compressor.

(4) Redundancy: Compressed air system capacity if a single unit fails.

(5) Cost for growth: Cost for an additional compressor to create 100% redundancy.

(6) Annual parts cost: Preventive maintenance filters and oil based on 8,760 hours a year and the system profile described above.

Option 1: smallest footprint, but most expensive and offers no redundancy

Option 2: lowest initial equipment cost and annual parts cost, offers redundancy, lowest 5-year life cycle costs, but not as efficient as option 3

Option 3: most efficient and offers some redundancy

Easy-read 12-inch color display

Durable, easy-to-use touchscreen

Advanced, capacitive touch technology, offset supplementary keys and durable LED illumination make the SIGMA AIR MANAGER 4.0 an exceptionally user-friendly tool, and not just on the haptic level, but also on a global one, since it supports 34 languages.

SIGMA AIR MANAGER® 4.0

Technical specification

	SIGMA AIR MANAGER 4.0 - 4	SIGMA AIR MANAGER 4.0 - 8	SIGMA AIR MANAGER 4.0 - 16
Controller and control modes			
Adaptive 3-D^{advanced} Control	Standard		
Flow rate control (for blowers)	Optional		
Possible air system interconnections			
Total number of controllable compressors/blowers	4	8	16
Compressors with SIGMA CONTROL 2 via SIGMA NETWORK	4	6*	6*
SNW ports RJ 45	Standard (6 ports, optionally expandable)		
~~SNW ports RJ 45 / FOC (Fiber Optic Cable)~~	~~Optional~~		
~~SNW ports RJ 45 / DSL (2/4 wire copper cable)~~	~~Optional~~		
~~SNW Ports RJ 45 with PoE (Power over Ethernet)~~	~~Optional~~		
Available input signals			
Digital 24V DC (e.g. ECO-DRAIN, compressors without SIGMA CONTROL, remote ON-OFF)	6 (optionally expandable)		
Analog 4-20 mA (e.g. pressure dew point measuring device, pressure transducer)	4 (optionally expandable)		
Available output signals			
Relay outputs (e.g. third party compressors, compressors with SIGMA CONTROL Basic, group alarm)	5 (optionally expandable)		
Equipment			
Visualization via integrated web server	Standard		
Operating data long-term memory 1 year	Standard		
Pressure transducer	Standard		
Communications interfaces			
Gigabit Ethernet for remote visualization (web server)	Standard		
Slot for communications module (e.g. PROFIBUS, Modbus TCP, Ethernet/IP, OPC UA)	Standard		
SD HC/XC card slot (e.g. updates)	Standard		
Dimensions, weight			
Width x Depth x Height	21 1/4” x 11 3/16” x 19”		
Weight	44.1 lbs		

*Expandable with addition of SNW Ports

The world is our home

As one of the world's largest compressed air systems providers and compressor manufacturers, KAESER COMPRESSORS is represented throughout the world by a comprehensive network of branches, subsidiary companies and factory trained partners.

With innovative products and services, KAESER COMPRESSORS' experienced consultants and engineers help customers to enhance their competitive edge by working in close partnership to develop progressive system concepts that continuously push the boundaries of performance and compressed air efficiency. Every KAESER customer benefits from the decades of knowledge and experience gained from hundreds of thousands of installations worldwide and over ten thousand formal compressed air system audits.

These advantages, coupled with KAESER's worldwide service organization, ensure that our compressed air products and systems deliver superior performance with maximum uptime.

KAESER COMPRESSORS®

Built for a lifetime.

TÜVRheinland CERTIFIED
Management System
ISO 9001:2015
ISO 14001:2015
www.tuv.com
ID 9108616471

MEMBER OF CAGI Compressed Air & Gas Institute

ENERGY STAR PARTNER

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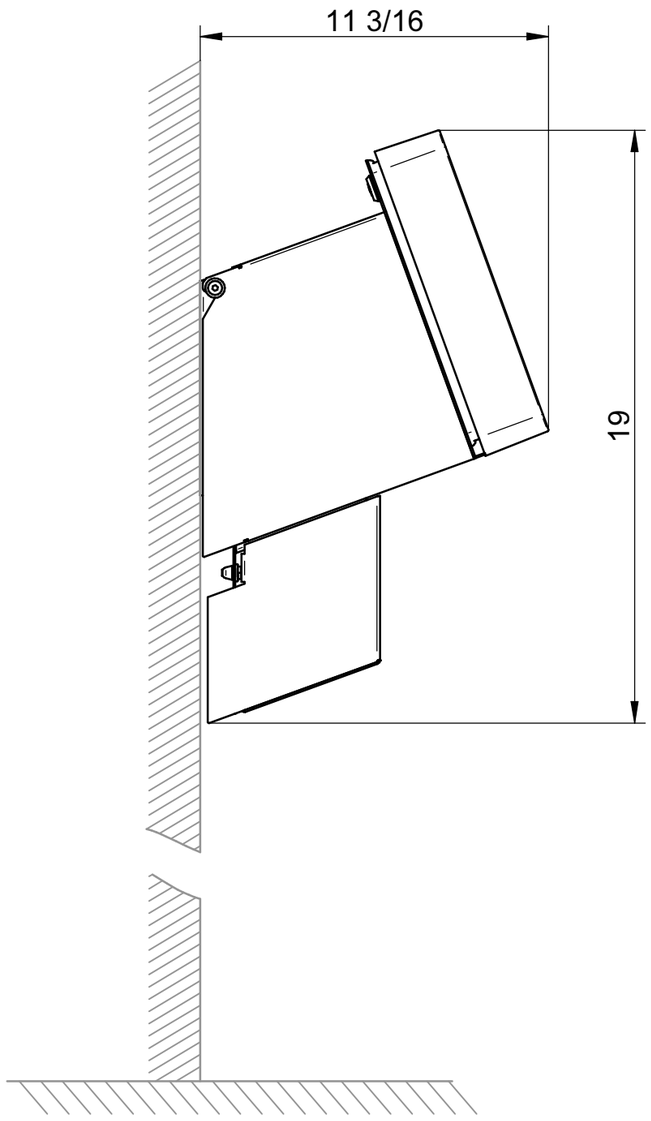
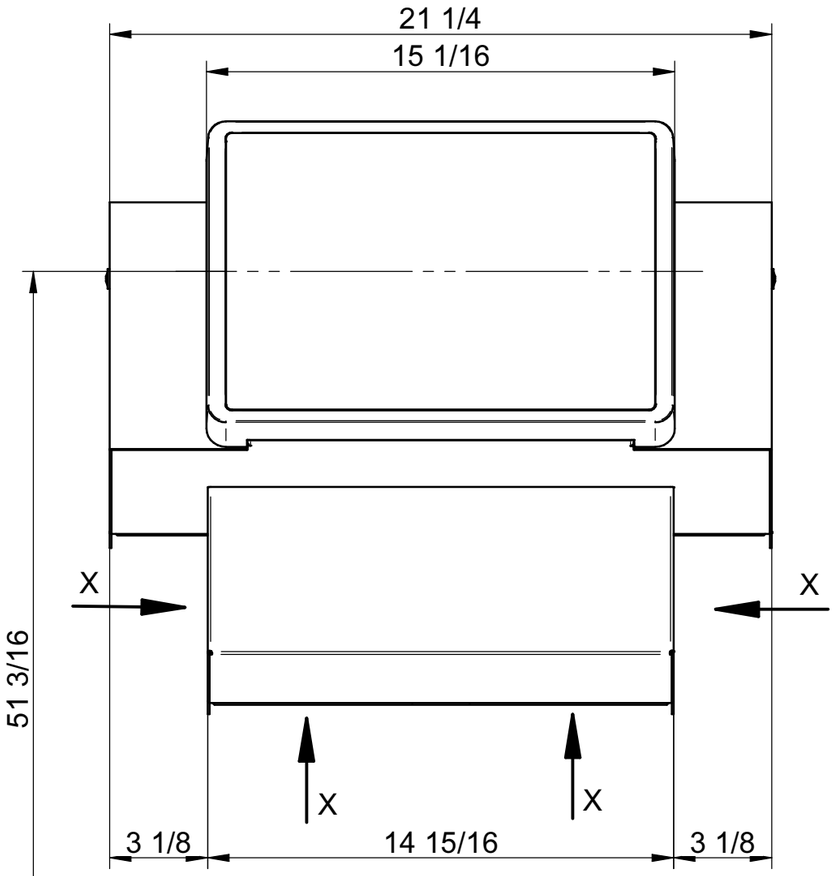
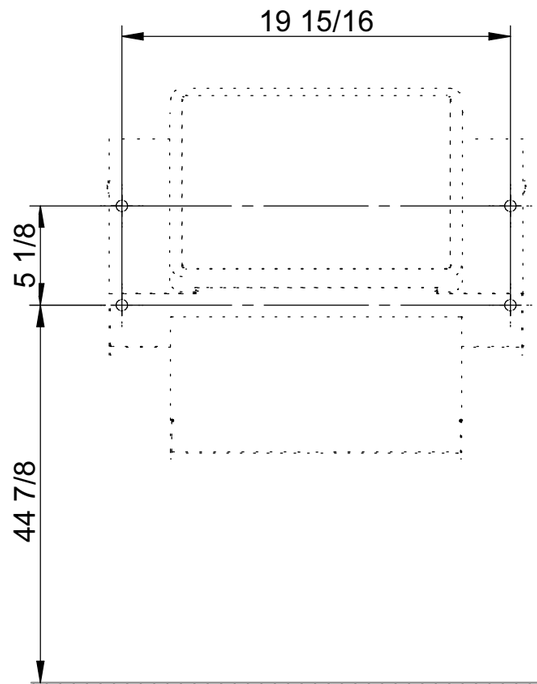
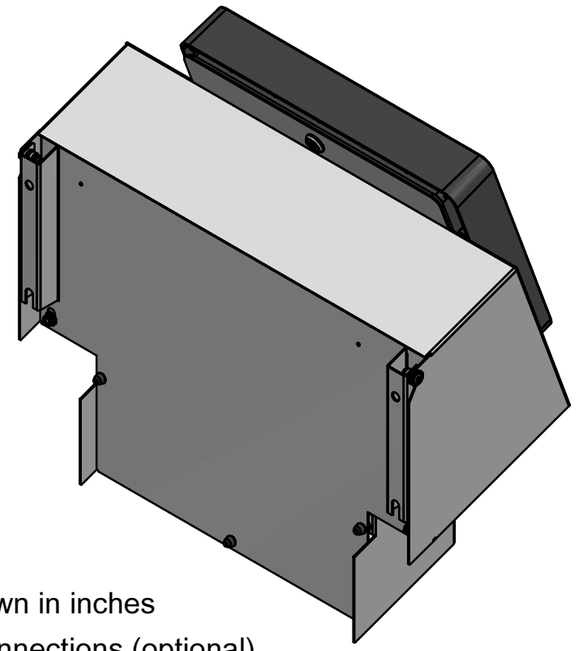
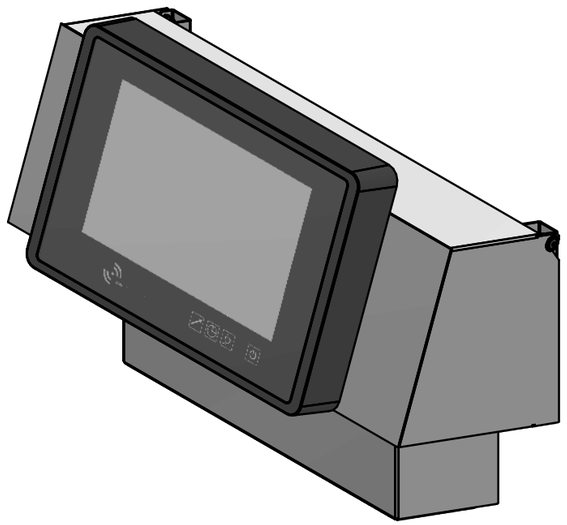




Hole pattern:







Dimensions shown in inches

X = Electrical connections (optional)

Change number	Projection	Scale 1 : 5		Date	Name	KAESER KOMPRESSOREN
			Drawn	10.06.2015	MARKOVIC	
Document TZM 10291143 USE 01		Original A3	Edited	11.06.2015	MARKOVIC	Language USE / Sheet 1 / 1
			Released	12.06.2015	SCHUBT4	
Document TZD 10291143 D 01		Designation SAM2.1				
Status Released		Dimension and connection dim.				125

Stand 05.12.2014

Warranty

KAESER COMPRESSORS®
Built for a lifetime.

SIGMA AIR MANAGER®

Model: _____ **Serial No:** _____ **Start-up Date:** _____

Kaeser Compressors, Inc. herein referred to as "Kaeser," warrants that the Kaeser SIGMA AIR MANAGER® delivered hereunder will be free of defects in material and workmanship for a period of twenty-four (24) months from the date of start-up, not to exceed thirty (30) months from the date of shipment from Kaeser, whichever occurs first.

Should any failure to conform with the above warranties occur during the specified period under normal use, and the equipment has been proven to Kaeser's satisfaction to have been properly stored, installed and maintained, and the purchaser has complied with all procedures outlined in the Kaeser Service Manual, then Kaeser shall, with prompt notice by purchaser, correct such non-conformities at its option either by repair or replacement or by refund of the purchase price of the non-conforming equipment. Return of equipment to such delivery point as Kaeser may direct pursuant to this paragraph shall be at purchaser's risk and expense. Kaeser warrants any equipment repaired or replaced pursuant to the above warranty, under normal use, to be free from defects in workmanship and material for a period of ninety (90) days after the start-up of such repaired or replaced equipment or for a period ending on the expiration of the original equipment warranty, whichever is longer. Unless otherwise expressly agreed, Kaeser shall not be responsible for labor charges, loss or damage resulting from improper operation, maintenance or repairs made by personnel other than those authorized in writing by Kaeser, or damage to the equipment caused by the use of non-authorized replacement parts. The effects of corrosion, erosion, and normal wear and tear are specifically excluded from Kaeser's warranty.

Repair, replacement, or refund (whichever Kaeser determines, in its sole discretion, to provide) shall be Kaeser's sole obligation and purchaser's exclusive remedy for any nonconformity, noncompliance, defect or deficiency in equipment furnished hereunder, and shall be conditioned upon the purchaser's return of the defective equipment to Kaeser (DAP Kaeser's directed delivery point), if Kaeser requires such return. This exclusive remedy will not be deemed to have failed ~~of~~ its essential purpose so long as Kaeser is willing to provide repair, replacement, or refund. THE EXPRESS WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESSED OR IMPLIED, AND KAESER EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM THE COURSE OF DEALING OR USAGE OF TRADE.

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

Product Warranty Registration

In order for Kaeser Compressors, Inc. to properly handle warranty or other service requests, please register online at us.kaeser.com/warranty.

LIMITATION OF LIABILITY

THE REMEDIES OF THE CUSTOMER SET FORTH HEREIN ARE EXCLUSIVE, AND KAESER'S LIABILITY WITH RESPECT TO EQUIPMENT SOLD HEREUNDER SHALL BE LIMITED TO THE APPLICABLE WARRANTY PROVIDED HEREIN AND, WITH RESPECT TO ANY BREACH OF ITS CONTRACT WITH CUSTOMER, SHALL BE LIMITED TO THE CONTRACT PRICE OF EQUIPMENT THAT IS THE SUBJECT OF THE BREACH; PROVIDED, HOWEVER, THAT THE FOREGOING SHALL NOT APPLY IN THE EVENT OF ANY ACT THAT CONSTITUTES GROSS NEGLIGENCE OR WILLFUL MISCONDUCT BY KAESER, AND THAT KAESER WILL HAVE NO LIABILITY WHATSOEVER WITH RESPECT TO ANY ADVICE OR TECHNICAL INFORMATION PROVIDED WITHOUT CHARGE. PRIOR TO CUSTOMER HAVING ANY RIGHT TO RECOVER DAMAGES (SUBJECT TO THE LIMITATIONS SET FORTH HEREIN), KAESER SHALL HAVE THE RIGHT TO CORRECT ANY DEFECT OR NON-CONFORMITY OF ANY EQUIPMENT SOLD HEREUNDER IN A REASONABLE TIME FRAME, AND IF KAESER DETERMINES THAT IT IS UNABLE OR UNWILLING TO CORRECT ANY SUCH DEFECT OR NON-CONFORMITY, THEN KAESER WILL ALSO HAVE THE RIGHT TO REFUND THE PRICE OF THE DEFECT OR NON-CONFORMITY. NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR EXPENSES INCURRED BY THE OTHER PARTY, THE OTHER PARTY'S CUSTOMERS OR ANY THIRD PARTY, WHETHER ARISING FROM BREACH OF CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHER THEORIES OF LAW OR EQUITY, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS OR REVENUE, LOSS OF USE OF EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE FACILITIES OR SERVICES, DOWNTIME COSTS OR CLAIMS OF CUSTOMERS OR SUCH OTHER PARTY FOR SERVICE INTERRUPTION, OR ANY OTHER TYPES OF ECONOMIC LOSS WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.

KAESER COMPRESSORS®

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SECTION 09900

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Surface preparation and application of coatings.

1.2 REFERENCES

A. The Society for Protective Coatings (SSPC):

1. Surface Preparation Specifications

a. SP-1 - Solvent Cleaning

b. SP-2 - Hand Tool Cleaning

c. SP-3 - Power Tool Cleaning

d. SP-5 - White Metal Blast Cleaning

e. SP-6 - Commercial Blast Cleaning

f. SP-7 - Brush-Off Blast Cleaning

g. SP-10 - Near-White Blast Cleaning

h. SP-13 – Surface Preparation of Concrete

2. SP-16 – Brush Off Blast of Galvanized and Non-Ferrous Metals

3. National Association of Pipe Fabricators (NAPF):

a. NAPF 500-03-01 - Solvent Cleaning

b. NAPF 500-03-02 – Hand Tool Cleaning

c. NAPF 500-03-03 – Power Tool Cleaning

d. NAPF 500-03-04 – Abrasive Blast Cleaning for Ductile Iron Pipe

e. NAPF 500-03-05 – Abrasive Blast Cleaning for Cast Ductile Iron Pipe

4. SSPC-PA 1 – Shop, Field and Maintenance Painting

5. SSPC-PA 2 - Measurement of Dry Coating Thickness with Magnetic Gages

6. SSPC Visual Standards SSPC VIS 1-89

7. SSPC Guide 6 – Guide for Containing Debris Generated During Paint Removal Operations

B. Occupational Safety and Health Administration (OSHA) Standards

C. American Society for Testing and Materials (ASTM)

1. ASTM D4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

2. ASTM F1869 – Standard Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

D. National Association of Pipe Fabricators (NAPF)

1. NAPF 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings In Exposed Locations Receiving Special External Coatings and/or Special Internal Linings

E. International Concrete Repair Institute (ICRI)

1. ICRI 310 - Selecting And Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.3 SCOPE OF WORK

A. Items of work for this contract include but are not limited to the surface preparation and coating of the following:

1. New ductile iron process piping.

2. Existing ductile iron pipe and valves that are being relocated and re-used.

3. Existing ductile iron piping that remains in place is not to be painted.

4. New valves.

5. Existing valves not being re-used are not to be painted.

B. Ventilation, dehumidification, and temperature control equipment required to provide and maintain the proper environment for worker protection and for coating application and curing.

1.4 SUBMITTALS

A. Applicator qualifications for general coatings.

B. List of coating products and systems proposed, giving brand, type and manufacturer.

C. Product for product listing of the manufacturer’s coating system showing a comparison with the specified coating systems in Schedules 09900-A and 09900-B.

D. Manufacturer's current printed recommendations and product data sheets for each system, and ASTM performance criteria.

E. Paint manufacturer's compatibility guide, to be a complete listing of all compatible paint systems/combinations produced by the paint manufacturer.

F. Provide manufacturer’s complete color charts/wheel, for each coating system.

G. When requested by the Engineer, provide product container labels and labeled mixing instructions for products utilized in the Work.

H. Method and equipment to be used for dehumidification.

I. Ventilating plan describing procedures and equipment that will be used.

J. Method to be used, and the size and type of abrasive media to be used for the abrasive blast cleaning.

K. Method and equipment to be used for temperature control.

1.5 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.

B. Applicator Qualifications – Minimum 5 years' experience in application of specified products.

C. Regulatory Requirements – Meet federal, state and local requirements limiting the emission of volatile organic compounds.

D. A qualified and experienced representative of the paint manufacturer shall meet with Contractor and Engineer to coordinate items requiring painting and to schedule the Work. Monthly field visits shall occur to ensure proper application of the painting system. The Contractor shall coordinate with the paint manufacturer to schedule site visits. The manufacturer's representative shall have an active certification as an AMPP Basic Coating Inspector (NACE CIP Level 1) at a minimum.

E. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.

1.6 DELIVERY, HANDLING, STORAGE AND PROTECTION

A. Deliver materials to painter's area in original, unbroken, containers with name and analysis of product, manufacturer's name, and shelf life date. Do not use or retain contaminated, outdated, prematurely opened, or diluted materials.

B. Storage of materials shall be in accordance with the paint manufacturer's recommendations.

C. Store coated items carefully. Store paints and painter's materials only in areas designated solely for this purpose. Avoid damaging or dirtying coatings by contact with soil, pavement or other harmful materials that might necessitate special cleaning. Use suitable blocking during storage.

D. Confine mixing, thinning, clean-up and associated operations, and storage of painting debris before authorized disposal, to these areas.

E. Do not expose primed surfaces to weather for more than six months before top coating. Allow less time if recommended by coating manufacturer.

F. Do not use plumbing fixtures, piping or mechanical equipment for mixing or disposal of paint materials.

G. Store waste temporarily in closed, nonflammable containers until final disposal. Keep no rubbish in painter's area longer than 24 hours. Finally, dispose of waste in an approved disposal system.

H. During surface preparation, cleaning and painting operations, protect all surfaces not to be painted.

I. Protect coated items, whether prime or finish, from damage due to shipping and handling. Use padding, blocking, fabric slings and extra care as required.

J. Upon completion of field painting, ensure coatings are undamaged and in good condition. Repair damaged or deteriorated coating, resulting from failure to observe foregoing requirements.

1.7 PROJECT/SITE CONDITIONS

A. Environmental Requirements:

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.

2. Do not apply coatings when dust is being generated.

B. Cover or otherwise protect work by other trades and surfaces not being painted during all painting operations.

C. All shop primed ferrous metals shall be primed using the same coatings specified in the paint schedule.

1.8 EXTRA MATERIALS

A. Provide one spare 1 gallon paint container for each type and color applied. Confirm final list of spare paint with owner before furnishing.

B. Multi-component products shall have sufficient unopened quantities of each component to produce the required amount of mixed paint for future maintenance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Coating systems are designated by reference to Tnemec Company, Inc. and Sherwin-Williams products to establish the type and quality required. Equal products as manufactured by International Protective Coatings, PPG Industries, Carboline Company or equal will be considered if provided with a “Product for Product” listing with the submittal. The Engineer reserves the right to request and receive detailed technical literature of each proposed coating system before approval.

B. No coating systems will be considered that decrease the film thickness, decrease the number of coats, decrease the effectiveness of the surface preparation or change the type of coating specified in the schedule of this section.

2.2 MATERIALS, GENERAL

A. Paint Coatings - Suitable for intended use, recommended by their manufacturer for intended service. All coatings, unless otherwise specified, shall be suitable for severe service.

B. Products Used - Minimum of five years satisfactory use under similar service conditions.

C. Use products of one manufacturer in any one paint coating system; all coating materials compatible. Coatings for touch-up - same as original.

D. Equipment prime or finish painted by the equipment manufacturer shall be painted in strict accordance with this Section and the equipment's individual specification section.

E. Bear entire responsibility in providing complete compatibility of all shop and field painting systems.

F. It is recognized that the specific application of the coating products varies for each specific manufacturer (number of coats, mil thickness per coat, etc.). Therefore, these Specifications represent the minimum to be provided under this contract and shall be increased in accordance with each manufacturer's recommendations.

2.3 COLORS AND FINISHES

A. All finish colors will be selected from manufacturer's color chips. The Owner will select the colors. Match final colors to selected color chips, as scheduled.

B. To provide contrast between successive coats, lightly tint each coat to distinguish it from preceding coats.

C. Unless otherwise indicated, use gloss or semi-gloss for finish paint.

2.4 COATING TYPES

A. Coating types and minimum acceptable percent (by volume) of component solids are described in Schedule 09900-A Coating Types. Description of coating systems including surface preparation and dry film thicknesses are included in Schedule 09900-B Coating Systems.

PART 3 EXECUTION

3.1 GENERAL

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work.

B. Do not proceed with surface preparation or coating application until conditions are suitable.

C. The following shop and field instruments shall be used to inspect surface preparation and dry film thickness.

1. SSPC visual standards SSPC-VIS 1-89

2. Testex Press-O-Film replica type x-coarse

3. Surface temperature thermometer

4. Sling psychrometer and psychrometric tables

5. Type I or Type II dry film thickness gauges

6. SSPC-PA2 methods

3.2 PREPARATION

A. Basic Steps

1. Arrange to do all preparation and paint work in heated enclosure unless ambient weather conditions ensure still, dry air and a minimum of 50 degree F temperature. Do not apply paints to surfaces in direct sunlight.

2. Coordinate cleaning and painting operations to eliminate contamination of one by the other.

3. Maintain all coating materials at manufacturer's recommended mixing and application temperatures for not less than 24 hours before use. Have clean, proper containers, spray equipment, applicators and accessory items ready for use before decanting or mixing paint materials.

4. Ensure proper coordination of materials to be applied hereunder with previous coatings on affected surfaces. Have all manufacturer's written directions on hand, and follow them strictly, except where otherwise specified.

5. Carefully coordinate preparation and material compatibility requirements of paint systems used by manufacturers to shop prime equipment.

B. Before any paint application, carefully clean all surfaces to be coated of dust, dirt, grease, rust, mill scale, paint unsuitable for top coatings, efflorescence, oil, moisture, foreign matter or conditions detrimental to coating bond and durability.

1. Following cleaning, apply preparatory treatment in strict accordance with manufacturer's written instructions.

2. Fill imperfections and holes in surfaces to be painted.

C. Metals

1. Prepare all field and shop primed ferrous metals, including galvanized ferrous metals, in accordance with Schedule 09900-B Coating System Schedule included under this Section.

2. A needle gun may be used for field welds and shop welds which occur in narrow, unprimed areas in an otherwise shop primed surface.

3. Bituminous coated metals for paint finish - clean of all dirt, grease, oil and foreign matter, and prime with a barrier coat to seal the bitumen and prevent bleeding and discoloration of finish.

D. Provide higher degree of cleaning for acceptable equivalent paint products when paint manufacturer recommends in his printed surface preparation recommendations.

E. Before applying field coat, touch-up abraded areas of shop coats with paint of the same type. Apply an entire coat if necessary. Touch-up coats are in addition to, and not a substitute for first field coat. Clean deteriorated surfaces to bare metal before applying touch-up coat.

3.3 VENTILATION

A. Particular care shall be exercised during the cleaning and painting of each room. Means of adequately removing air from each room shall be provided, in order to remove dust and solvent vapors.

B. During the cleaning and painting operations, the painters shall be provided with proper respiratory protection in accordance with OSHA regulations.

C. In addition to meeting the minimum requirements listed above, the Contractor shall be responsible for complying with all applicable regulations of the various local, state, and federal agencies.

3.4 DEHUMIDIFICATION

A. Continuous dehumidification of areas where paint coatings will be applied may be required twenty-four hours per day during all surface preparation, painting, and curing. The equipment used must be capable of maintaining the interior air quality at or below 20 percent relative humidity during surface preparation and between 40% and 80% during the coating application and curing process of interior finish coat(s). The surfaces must be dry and 5 degrees above the dew point.

B. Humidity shall be monitored using a strip chart recorder that provides continuous measurement of humidity and air temperature.

C. In the event of dehumidification equipment failure, prepared surfaces that have been approved for priming will not be allowed to stand uncoated and must be painted before the end of the shift.

3.5 TEMPERATURE CONTROL

A. Auxiliary heat and/or cooling may be necessary to maintain the room temperature at an acceptable level for the coating manufacturer's application parameters. The equipment must be compatible with the required dehumidification equipment and meet the following requirements.

1. The air from heaters and refrigerant type systems shall be connected to the process air supply duct from the dehumidifier.

2. Only electric, indirect fired combustion, or steam coil auxiliary heaters may be used. Direct-fired space heaters are not permitted during the blasting, coating or curing phases.

3. Heaters shall be equipped with controls that automatically turn the heaters off if the airflow is interrupted or the internal temperature exceeds its design temperature or that of the supply duct.

4. The area where dehumidification is introduced shall be sealed to allow the air to escape away from the entry point while maintaining a slight positive pressure unless dust from the operation is hazardous. The design of the filter system, if necessary, shall be such that it does not interfere with the dehumidification equipment's ability to control the dew point and temperature parameters in that space. Do not recirculate the air from the space or from the filtration equipment back through the dehumidifier during the coating application or when solvent vapors are present.

5. Maintain a minimum temperature of 50 degrees F for a minimum of seven (7) days after a coating application.

3.6 APPLICATION

A. Conditions

1. Do not apply paints or other finish to wet or damp surfaces, except in accordance with instructions of manufacturer. Do not apply exterior paint during cold, rainy, or frosty weather, or when temperature is likely to drop to freezing within the paint coatings curing time as specified by the paint manufacturer. Avoid painting of surfaces while they are exposed to direct sunlight.

2. Paint surfaces which have been cleaned, pretreated, or otherwise prepared for painting with first finish coat as soon as practicable after such preparation has been completed, but in any event prior to deterioration of prepared surface.

3. Coat blast cleaned metal surfaces immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Do not coat blast cleaned surfaces later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.

4. Work shall conform to SSPC-PA 1.

B. Methods

1. Prepare surfaces, mix and apply paint materials in strict accordance with manufacturer's printed instructions and recommendations, except where specifically directed otherwise. Control temperature of materials upon mixing and application, surface temperature and condition, thinning and modifying.

2. Protect surfaces to be coated, before, during and after application unless ambient weather conditions are favorable.

C. Workmanship

1. Apply coating materials to meet manufacturer's spreading rate and dry film thickness recommendations. Dry film thicknesses specified are constant for brush, spray, roller or other form of application.

a. Control thinning for spray use and to manufacturer's printed instructions, and produce specified dry film thickness on level surfaces, interior and exterior angles.

b. Record quantities of materials of each type, for each coat used.

2. Apply paints and coatings using skilled painters, brushed or rolled or sprayed out carefully to a smooth, even coating without runs or sags. Allow each coat of paint to dry thoroughly, on the surface and throughout the film thickness, before the next coat is applied. High polymer coatings may be exempted from the drying requirement if recoat time is specified by manufacturer.

3. Finish surfaces - Uniform in finish and color, and free from flash spots and brush marks.

4. Accessory items, finish hardware, lighting fixtures, escutcheons, plates, trim and similar finish items not to be painted: Remove or carefully mask before painting adjacent surfaces; carefully replace and reposition upon completion of adjacent painting and cleaning work.

3.7 PROTECTION, CLEAN-UP

A. Protect all materials and surfaces painted or coated under this Section, from the time of surface preparation until the final coat has fully dried. Also protect all adjacent work and materials from touch-up painting by the use of sufficient drop cloths during the progress of this work. Upon completion of the work, clean up all paint spots, oil, and stains from floors, glass, hardware, and similar finished items.

3.8 PAINT SCHEDULE

A. Coordinate, schedule and confirm the various cleaning, touch-up and finishing operations. Ensure the transmission of materials data, color selections and coating system methods between the coating applicators. Take responsibility for not exceeding exposure and recoat time limits.

3.9 FIELD QUALITY CONTROL

A. Leave staging and lighting in place until the Engineer has inspected surface or coating. Replace staging removed prior to approval by the Engineer. Provide additional staging and lighting as requested by the Engineer.

B. Unsatisfactory Application

1. If surface has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.

2. Evidence of runs, bridges, shiners, laps or other imperfections is cause for rejection.

3. Repair defects in accordance with written recommendations of coating manufacturer.

C. Damaged coatings, Pinholes and Holidays

1. Feather edges and repair in accordance with recommendations of paint manufacturer.

2. Hand or power sand visible areas of chipped, peeled or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on the extent of repair and appearance, a finish sanding and topcoat may be required.

3. Apply finish coats, including touchup and damage repair coats in a manner that will present a uniform texture and color-matched appearance.

3.10 FINAL TOUCH-UP

A. Prior to final completion and acceptance, examine painted and finished surfaces and retouch or refinish as necessary to leave surfaces in perfect condition.

B. After doors have been fitted and hung, refinish edges, tops and bottoms.

Schedule 09900-A - Coating Types		
Tnemec Company Inc.	**Sherwin-Williams**	**Type of Coating System (Solids Content by Volume)**
Series 1026 Enduratone	DTM Acrylic Primer-Finish or Pro Industrial Pro-Cryl Universal Acrylic Primer	Acrylic Emulsion (43.0 ± 2.0%).
Series V140 Pota-Pox	Sherplate 600 or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)
Series V140F Pota-Pox (Fast Cure)	Sherplate 600 or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)
Series 1029 Enduratone	Sher-Cryl HPA High Performance Acrylic-Semi-Gloss	HDP Acrylic Polymer (40.0 ± 2.0%)
Series V69 Hi-Build Epoxoline	Macropoxy 5500 Low VOC Epoxy or Sherglass FF	Polyamide Epoxy (78.0 ± 2.0%)
Series 1095 Endura Shield	Hi Solids Polyurethane 250 Semi-Gloss	Aliphatic Acrylic Polyurethane (58.0 ± 2.0%)
Series 94-H2O Hydro-Zinc	Corothane I Galvapac 1K Zinc Primer (NSF)	Aromatic Urethane, Zinc Rich (63.0 ± 2.0%)
Series G435 Perma-Glaze	Duraplate 6000	Modified Polyamine Epoxy (100%)
Series 1 Omnithane	Corothane I Mio/Zinc Primer (Non-NSF) or Corothane I Galvapac 1K Zinc Primer (NSF)	MIO/Zinc-Filled Urethane (61.0 ± 2.0%)

Schedule 09900-B - Coating Systems				
Surface	**System Surface Preparation (Shop/Field)**	**System Finishes**		
		Primer	**2nd**	**Final**
		DFT = Dry Film Thickness, Mils		
Ferrous Metals, Interior Non-Submerged	SSPC-SP-6	Series 1 (2.5-3.5 DFT)	Series V69 (4.0-6.0 DFT)	Series 1095 (2.5-5.0 DFT)
		Corothane I Mio/Zinc Primer (3.0-4.0 DFT)	*Macropoxy 646 FC Epoxy (5.0-7.0 DFT)*	*Hi Solids Polyurethane 250 Semi-Gloss (3.0-5.0 DFT)*
Ductile and Cast Iron Pipe, Interior and Exterior, Non-submerged	NAPF 500-03-04 / SSPC-SP-6	Series V69 (3.0-5.0 DFT)	Series V69 (3.0-5.0 DFT)	Series 1095 (2.5-5.0 DFT)
		Macropoxy 646 FC Epoxy (3.0-5.0 DFT)	*Macropoxy 646 FC Epoxy (3.0-5.0 DFT)*	*Hi Solids Polyurethane 250 Semi-Gloss (3.0-5.0 DFT)*
Notes *(1)* Tnemec Products are listed in the first row for each surface and Sherwin-Williams products are listed in italics on the second row for each surface without a dry film thickness. Refer to Paragraph 2.1 for "or equal" products.				

END OF SECTION

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SECTION 020800

ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. The work covered in this section includes the minimum procedures that must be employed during abatement of asbestos-containing materials (ACM).

1. ACM, defined as greater than or equal to (≥) one percent (1%) asbestos, has been identified, will be impacted by the demolition, and require abatement.

B. Refer to other Sections of these Specifications to determine the type and extent of work therein affecting the work of this Section, whether or not such work is specifically mentioned herein.

1.2 RELATED INFORMATION

A. Related Documents

1. Quality Environmental Solutions & Technologies, Inc.'s (Quest) Pre-Renovation Environmental Survey Report for Asbestos containing Materials (ACM) & Lead-Based Paint (LBP) dated September 7, 2025

B. Related Drawings

1. D1-02 Blower Building First Floor Demolition Plan

1.3 PROJECT DESCRIPTION

A. The scope of work to be performed includes, but is not limited to, the proper removal, handling, and disposal of ACM to be disturbed during blower replacement. Refer to Table 1 at the end of this Section for base bid asbestos-containing materials scheduled to be removed.

B. The Asbestos Abatement Contractor (the "Contractor") must review all related documents and drawings and conduct site visits as required to develop a comprehensive understanding of ACM required to be removed at the Site.

C. Base Bid asbestos abatement work will include, but is not necessarily limited to, the ACM identified in Table 1 located at the end of this Section.

1. The quantities in the tables are provided to establish the order of magnitude of the abatement project.

2. Actual quantities may vary.

3. It is the sole responsibility of the Contractor to visit the site, review the Contract Documents and determine the quantities of ACM to be removed when developing their Bid.

1.4 APPLICABLE CODES

A. The Contractor must be solely responsible for conducting this project and supervising all work in conformance with all federal, state, and local regulations and guidelines

pertaining to asbestos abatement. Specifically, the Contractor must comply with the following requirements:

1. United States Environmental Protection Agency (EPA) National Emissions for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M)
2. EPA Asbestos Hazard Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 61, Subpart E)
3. Occupational Safety and Health Administration (OSHA) Asbestos Regulations (Title 29 CFR, Part 1926.1101)
4. New York State Department of Labor (NYSDOL) Industrial Code 56 (ICR-56)
5. New York State Department of Health, Title 10 Part 73 Asbestos Safety Program Requirements
6. State of New York Licensing and Training Requirements as required in Part 56 of Title 12 of the Official Compilation of Codes, Rules, and Regulation of the State of New York latest edition
7. International Building Code as adopted by the State of New York Building Code including amendments
8. New York State Fire Safety Code
9. Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories

1.5 FINAL RE-OCCUPANCY AIR CLEARANCE – NOT REQUIRED FOR MINOR PROJECTS

1.6 WORK SITE SAFETY PLAN

A. The Contractor must establish a set of emergency procedures and must post them in a conspicuous place at the work site. The safety plan should include provisions for the following:

1. Evacuation of injured workers.
2. Emergency and fire exit routes from all work areas.
3. Emergency first aid treatment.
    a. Local hospital name and phone number.
4. Most direct route to the Site. Local telephone numbers for emergency services including ambulance, fire, and police.
    a. A method to notify workers in the event of a fire or other emergency requiring evacuation of the building.
5. Confined space entry program (if applicable).
6. Site security program.

B. The Contactor is responsible for training all workers in these procedures.

1.7 CONTROL OVER REMOVAL WORK

A. All Contractor work procedures must be monitored by the Contractor's "Competent Person" to ensure that areas outside the designated work locations do not become contaminated. The following controls must be implemented each working day to help ensure this:

1. Prior to work on any given day, the Contractor's designated "Competent Person" must evaluate job tasks with respect to safety procedures and requirements specified to prevent contamination of the building or the employees. This includes a visual survey of the work area and the decontamination enclosure systems.

B. The Contractor must maintain control of and be responsible for access to all work areas to ensure the following requirements:

1. Nonessential personnel are prohibited from entering the work area.

2. All authorized personnel entering the work area must sign the work area entry log.

3. All authorized personnel entering the work area must read the "worker protection procedures" which are posted at the entry points to the enclosure system and must be equipped with properly fitted respirators and protective clothing.

4. All personnel who are exiting from the decontamination enclosure system must be properly decontaminated.

5. Asbestos waste that is taken out of the work area must be properly bagged and labeled in accordance with these specifications. The surface of the bags must be decontaminated. Asbestos waste leaving the enclosure system must be transported off site or immediately placed in locked, posted temporary storage containers on site, and be removed within 24-hours of the project conclusion.

6. Any material, equipment, or supplies that are brought out of the decontamination enclosure system must be cleaned and decontaminated by wet cleaning and/or HEPA vacuuming of all surfaces.

1.8 SITE SECURITY

A. The Contactor must be responsible for the security of regulated areas.

B. Post required asbestos abatement warning signs at entrances to the work area including the waste load out and worker decontamination chamber.

C. The Contractor must have a supervisor monitoring the entrance of the worker decontamination chamber during abatement work.

D. The Contractor must install plywood window barriers that will accommodate all negative pressure exhausts during abatement.

1.9 PERSONNEL PROTECTION

A. Prior to commencing work, instruct all workers in all aspects of personnel protection, work procedures, emergency procedures and use of equipment including procedures unique to this project.

B. Respiratory protection must meet the requirements of OSHA as required in Title 29 CFR Parts 1910.134, 1926.11, and 1926.62.

C. A formal respiratory protection program must be implemented in accordance with Title 29 CFR, Part 1926.1101 and Title 29 CFR, Part 1910.134.

D. The Contractor must conduct exposure assessment air sampling, analysis and reporting to ensure the workers are using appropriate respiratory protection.

E. The Contractor must provide appropriate respiratory protection for each worker and ensure usage during potential asbestos exposure.

F. The Contractor must provide respirators from among those approved as being acceptable for protection by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of Title 30 CFR, Part II.

G. The Contractor must provide an adequate supply of filters for respirators in use.

H. Minimum respiratory protection must be as follows:

Air borne Asbestos Level:	Required Respirator:
Not in excess of 1 f/cc (10 x PEL)	Half facepiece mask air purifying or otherwise as required respirator other than a disposable respirator, equipped with HEPA P 100 filters
Not in excess of 5 f/cc (50 x PEL)	Full facepiece air purifying respirator equipped with HEPA P 100 filters.
Not in excess of 100 f/cc (1,000 x PEL)	Tight-fitting powered air purifying respirator equipped with HEPA P 100 filters, or any supplied air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1,000 x PEL)	Full facepiece supplied air respirator operated in pressure demand mode.
Greater than 1,000 f/cc (10,000 x PEL)	Full facepiece supplied air respirator unknown operated in pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus

Note:

1. Respirators assigned for higher airborne fiber concentrations may be used at lower concentrations.
2. A high efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.
3. In addition to the selection criteria in this section, the Contractor must provide a tight-fitting powered air purifying respirator equipped with high efficiency filters or a full facepiece supplied air respirator operated in the pressure demand mode

equipped with HEPA egress cartridges or an auxiliary positive pressure self-contained breathing apparatus for all employees within the regulated area where Class I work is being performed for which a negative exposure assessment has not been produced and the exposure assessment indicates the exposure level will not exceed 1 f/cc as an 8-hour time weighted average. A full facepiece supplied air respirator operated in the pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus must be provided under such conditions if the exposure assessment indicates exposure levels above 1 f/cc as an 8-hour time weighted average.

4. If compressed air is used for supplied air respirators, this air will meet the requirements for grade D breathing air as described by the Compresses Gas association commodity Specification G-7.1. The compressor will be equipped with the necessary safety devices and sorbents/filters and be situated to avoid entry of contaminated air. In addition, the compressor will be equipped with alarms to indicate failure or overheating, and additional alarms for indicating the presence of carbon monoxide. Airline couplings will be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with non-respirable gases.

I. The Contractor must provide and require all workers to wear protective clothing in Work Areas where asbestos fiber concentration exceeds permissible limits established by the OSHA or where contamination exists. Protective clothing must include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings.

J. The Contractor must ensure that all authorized persons entering contaminated areas are equipped with proper respirators and protective clothing.

1.10 WORKER PROTECTION PROCEDURES

A. The Contractor must monitor airborne asbestos concentrations in the workers' breathing zone to establish conditions and work procedures for maintaining compliance with OSHA Regulations Title 29 CFR Part, 1910.1001 and Part 1926.1101.

B. The Contractor’s air sampling professional must document all air sampling results and provide all air sampling reports as soon as feasible. OSHA air monitoring results must be posted at a conspicuous location at the job site.

C. All personnel air sampling must be conducted in accordance with methods described in OSHA standards Title 29 CFR 1910.1001 and 29 CFR 1926.1101.

D. The Contractor is responsible for complying with all additional OSHA regulations while performing work on this project.

1.11 WORKER QUALIFICATIONS, TRAINING, AND EDUCATION

A. Contractor is required to have a minimum OSHA Class I-certified Supervisor on-site at all times work is in progress.

B. Contractor is required to have an accredited asbestos Supervisor in each work area at all times work is in progress.

1. Supervisor must be fluent in English.

C. The Supervisor must be thoroughly familiar and experienced with asbestos abatement and related work and must enforce the use of all safety procedures and equipment. He/she must be knowledgeable of EPA, OSHA, NYSDOL, and NIOSH requirements and guidelines.

D. Enforce strict discipline and good working order at all times among employees. Do not employ any person not skilled in the work assigned, nor anyone who has not received documented notice of the hazards of asbestos abatement, formal training in the use of respirators, safety procedures, equipment, clothing, and work procedures. All workers must be licensed in accordance with applicable state regulations.

1.12 SUBMITTALS

A. The Contractor will submit the following submittals to the Engineer at least ten calendar days prior to the commencement of removal work:

1. Submit copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.

2. Written Contractor Work Plan that summarizes the Contactor's means and methods related to the demolition, containment, management, and disposal of regulated asbestos and wastes.

a. Figure(s) depicting locations of decontamination systems and negative air machines and associated exhaust.

b. Proposed removal procedures along with management and disposal of ACM.

c. Information on how and where wastes will be stored, marked, and disposed of, and how field equipment will be decontaminated.

d. A description of the waste load-out process and route to disposal containers shall also be included.

e. Address personal protective equipment, worker health and safety training, and decontamination procedures.

f. Copies of asbestos abatement training for all workers and supervisors involved with ACM removal.

3. Submit a schedule to the Owner and the Engineer that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).

4. Submit the current valid State of New York Asbestos Abatement Contractor license and certificate of insurance.

5. Submit the name and address of the hauling contractor and landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.

6. Submit details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for the proper removal, handling, and disposal of ACM in compliance with this specification and applicable regulations. Include any proposed deviations from these specifications and applicable regulations.

7. Submit the training, medical, respirator fit test records, and NYSDOL asbestos license of each employee who may be on the Site.

8. If the Contractor's NYSDOL-licensed Asbestos Abatement Supervisor is not conducting OSHA-required employee exposure monitoring, submit the qualifications of the air sampling professional that the Contractor proposes to use for this project for this task.

9. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project.

10. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.

11. Submit a chain-of-command, with contact information, for the project.

12. Submit a site-specific Work Site Safety Plan (WSSP) for the project detailed in Section 1.6. If this information is contained within a WSSP prepared by the Site's General Contractor, a copy must be submitted for review.

13. Submit a written site-specific Respiratory Protection Program for employees for the Work, including make, model and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable).

14. Submit the proposed electrical safeguards to be implemented by a State of New York-licensed electrician, including but not limited to location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the Work, including a description of electrical hazards and a safety plan for common practices in the work area. This may also include a safety plan for temporary lighting, extension cords, and other powered equipment used in the work area (locations, daily inspections, etc.).

15. Submit the proposed worker orientation plan that, at a minimum, includes a description of asbestos hazards and abatement methodologies, a review of worker protection requirements, and the outline of safety procedures.

A. The Contractor will submit the following to the Engineer during the course of the work:

1. Daily results of all personal air sampling.

2. Certificates, training, medical, and fit-test records for new employees to start work (24 hours in advance of work).

3. Contractor site logs and containment sign-in sheets.

4. Revised Notification, if any.

5. Copies of Waste Shipment Records (WSRs) for waste that leaves the site.

B. The following must be submitted to the Engineer within forty-five days of the completion of work:

1. Completed copies of WSRs.

2. Remaining personal air sampling results and site logs.

1.13 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

A. The Contractor must make the required written notifications as follows prior to commencement of asbestos abatement.

1. NYSDOL Asbestos Abatement Notification (if applicable)

   a. Submit Notification prior to the commencement of abatement totaling greater than or equal to (≥) 10 linear feet (LF) and/or 25 square feet (SF) to the NYSDOL.

   b. The notification and associated fee are required 10-calendar days prior to the start of the abatement project and/or phase. The Contractor must include the notification fees in their base bid price.

   c. The notification must be submitted to the following agency:

      1) State of New York Department of Labor
      Division of Safety and Health
      Asbestos Control Bureau
      State Office Building Campus, Building 12, Room 454
      Albany, New York 12240

   d. The minimum information in the notification to the NYSDOL must include:

      1) Name and address of building Owner/Operator

      2) Building location

      3) Building size, age, and use

      4) Asbestos quantity

      5) Work schedule, including proposed start and completion date

      6) Asbestos removal procedures to be used

      7) Name and location of disposal site for generated asbestos waste, residue, and debris

2. EPA NESHAP Asbestos Abatement Notification

   a. Submit Notification prior to the commencement of asbestos abatement associated with the building renovation.

   b. The notification is required 10-working days (excluding weekends and federal holidays) prior to the start of the abatement project and/or phase.

   c. The notification must be submitted to the following agency:

      1) Asbestos NESHAP Coordinator
      EPA Region 1
      5 Post Office Square
      Suite 100
      Boston, MA 02109

   d. The minimum information in the notification to the EPA must include:

      1) Name and address of building Owner/Operator

      2) Building location

      3) Building size, age, and use

4) Asbestos quantity

5) Work schedule, including proposed start and completion date

6) Asbestos removal procedures to be used

7) Name and location of disposal site for generated asbestos waste, residue, and debris

1.14 DEFINITIONS

A. Abatement: Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.

B. Air Monitoring: The process of measuring the total airborne fiber concentration of an area, or a person.

C. Amended Water: Water to which a surfactant (wetting agent) has been added.

D. Asbestos: The name given to a number of naturally occurring fibrous silicates. This includes the serpentine forms and the amphiboles, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically altered.

E. Asbestos Fibers: Those particles with a length greater than five (5) microns and a length to diameter ratio of 3:1 or greater.

F. Asbestos Work Area: A regulated area as defined by OSHA Title 29 CFR, Part 1926.1101 where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area must comply with requirements of regulated area for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.

G. Clean Room: An uncontaminated area or room, which is a part of the worker decontamination enclosure with provisions for storage of worker street clothes and protective equipment.

H. Clearance Sampling: Final air sampling performed aggressively after the completion of the abatement project in a regulated area. Air samples collected by the air sampling professional having a total airborne fiber concentration of less than 0.010 fibers per cubic centimeter of air (fibers/cc) in each of five (5) samples collected inside the containment will denote acceptable clearance sampling by Phase Contrast Microscopy (PCM), or five air samples collected inside the containment by the air sampling professional having an average asbestos concentration of less than 70 structures per square millimeter (S/mm^2) of air will denote acceptable clearance sampling for Transmission Electron Microscopy (TEM).

I. Competent Person: As defined by OSHA Title 29 CFR, Part 1926.1101, a representative of the Abatement Contractor who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. The Competent Person has authority to take prompt corrective measures, and to eliminate such hazards during asbestos removal. The Competent Person must be properly trained in accordance with EPA's Model Accreditation Plan (MAP).

J. Containment – An enclosure within the building which establishes a contaminated area and surrounds the location where ACM and/or other toxic or hazardous substance removal is conducted and establishes a Control Work Area.

K. Curtained Doorway: A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of six feet apart can form an airlock.

L. Decontamination Enclosure System: A series of connected areas, with curtained doorways between any two adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.

M. Encapsulant: A liquid material which can be applied to ACM, which controls the possible release of asbestos fibers from the materials either by creating a membrane over the surface (bridging encapsulant) or penetrating the material and binding its components together (penetrating encapsulant).

N. Engineer: Third Party Engineering/Environmental Consultant.

O. Equipment Room: Any contaminated area or a room that is part of the worker decontamination enclosure with provisions for storage of contaminated clothing and equipment.

P. Fixed Object: Unit of equipment or furniture in the work areas that cannot be removed from the work area.

Q. Friable Asbestos Materials: Any material that contains more than 1% asbestos by weight, which can be crumbled, pulverized, or reduced to powder by hand pressure.

R. HEPA Filter: High Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2.

S. HEPA Vacuum Equipment: Vacuum equipment fitted with a HEPA filter system for filtering the effluent air from the unit.

T. Movable Object: Unit of equipment of furniture in the work area that can be removed from the work area.

U. Negative Air Pressure Equipment: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.

V. NESHAP: National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.

W. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The new limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers per cubic centimeter (fibers/cc) as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc averaged over a sampling period of 30 minutes as an Excursion Limit. The Contractor must be responsible for maintaining work areas in a manner that this standard is not exceeded.

X. Project Monitor: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or an Engineer with experience in asbestos air monitoring and worker protection equipment and procedures. This individual should have demonstrated proficiency in

conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

Y. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 - 265).

Z. Regulated Area: An area established by the employer to demarcate where Class I, II, and III asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate, and a work area within which total airborne fiber concentrations exceed, or there is a reasonable possibility that they may exceed the PEL.

AA. Shower Room: A room between the clean room and the equipment room in the work decontamination enclosure with hot and cold running water and suitably arranged for employee showering during decontamination. The shower room is located in an airlock between the contaminated area and the clean area.

BB. Totally Enclosed Manner – A manner that will ensure no exposure of human beings or the environment to a concentration of asbestos.

CC. Transport Vehicle – A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.

DD. Waterproofing: Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities); sometimes combined with felts.

PART 2 MATERIALS AND EQUIPMENT

2.1 MATERIALS

A. Deliver all materials in the original packages, containers, and/or bundles bearing the name of the manufacturer, brand name, and product technical description.

B. Damaged or deteriorating materials must not be used and must be removed from the premises. Material that becomes contaminated with asbestos must be decontaminated or disposed of as asbestos waste.

C. Polyethylene sheet in a roll size to minimize the frequency of joints must be delivered to job site with factory label indicating 4 or 6 mils.

D. Polyethylene disposable bags must be true 6-mil with preprinted labels.

E. Tape or adhesive spray must be capable of sealing joints in adjacent polyethylene sheets and for attachment of polyethylene sheets to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.

F. Surfactant (wetting agent) must consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and must be mixed with water to provide a concentration of one ounce surfactant to five gallons of water or as directed by manufacturer.

G. Impermeable containers are to be used to receive and retain any asbestos-containing or contaminated materials until disposal at an acceptable disposal site. (The containers must be labeled in accordance with OSHA Standard Title 29 CFR, Part 1926.1101.) Containers must be both air and watertight.

H. Labels and signs, as required by OSHA Standard Title 29 CFR, Part 1910.1001 will be used.

I. Encapsulant must be bridging or penetrating type which has been found acceptable to the Owner. Usage must be in accordance with manufacturer's printed technical data.

J. Disposal labels must be preprinted on self-adhesive labels with the generator name, abatement site and contractor's name and address. Labels must not be photocopied and applied with spray adhesive.

2.2 TOOLS AND EQUIPMENT

A. Provide suitable tools for asbestos removal, encapsulation, and enclosure.

B. The Contractor Personnel exposure surveillance per OSHA requirements.

C. The Contractor must have available sufficient inventory on site for materials necessary for the job including protective clothing, respirators, filter cartridges, polyethylene sheeting of proper size and thickness, tape, and air filters.

D. The Contractor is responsible for securing electrical power before the commencement of asbestos removal.

E. The Contractor must provide temporary electrical power sources such as generators (when required).

F. The Contractor must have available shower stalls and sufficient hose length and a drain system equipped with 5-micron filters.

G. Exhaust air filtration system units must contain HEPA filter(s) capable of sufficient air exhaust to create negative pressure of 0.02 inches of water within the enclosure with respect to the outside area.

1. Equipment must be checked for proper operation by smoke tubes or a differential pressure gauge before the start of each shift and at least twice during the shift.

2. Adequate exhaust air must be provided for a minimum of four air changes per hour within the enclosure.

3. No air movement system or air filtering equipment must discharge unfiltered air outside.

H. Vacuum units, of suitable size and capacities for project, must have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers in diameter or larger.

I. The Contractor will have reserve exhaust air filtration system units in order to maintain negative air filtration in the event that a unit malfunctions during use.

J. The Contractor must have available and use recording manometers to monitor pressure differential between the work area and occupied areas of the building. A minimum negative pressure differential of 0.02 inches of water column must be maintained.

K. The Contractor must have available spray equipment capable of mixing a wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with asbestos.

L. HEPA filtered local exhaust ventilation must be utilized during the installation of enclosures and supports where ACM may be disturbed.

PART 3 EXECUTION

3.1 SUMMARY OF WORK

A. ACM to be abated, removed, or otherwise managed is located throughout the building as described in this Section. Contractor must review the entire Project Manual and all Drawings and understand the full scope of hazardous building materials abatement and material demolition before starting the Work.

B. Specific locations where select ACM is located and must be abated are called out in the sub-parts below. Where specific locations are not called out, refer to Table 1 at the end of this Section. All ACM that is identified in this Section must be abated regardless of where it is identified in the documents.

3.2 PRE-CONSTRUCTION MEETING

A. At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.

B. The Contractor must present a detailed project schedule and project submittals prior to the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Engineer will inform the Contractor of any scheduling adjustments for this project.

C. Following the Pre-Construction meeting, the Contractor must submit a revised schedule (if needed) no later than one week after the meeting.

3.3 INTERIOR WORK AREA PREPARATION – GENERAL

A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during abatement/decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture.

B. When shutting down electrical power, including receptacles and light fixtures, lock and tag out procedures must be used for circuits associated with the electrical components in the work area(s).

C. When necessary, provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All temporary installations are to be made by a licensed electrician, installed outside work areas, and permitted as required. Temporary power shall be continuous. Portable generators for use during abatement are not authorized.

D. Shut down and/or isolate heating, cooling, and ventilation air systems or zones to prevent contamination and fiber dispersal to other areas of the structure. Lock and tag out circuits associated with heating and cooling units. During the work, vents within the work area must be sealed with duct tape and polyethylene sheeting.

E. Seal off all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffuser, and any other penetration of the work areas, with polyethylene sheeting minimum of 6-mil thick sealed with duct tape. This includes doorways and corridors which will not be used for passage during work areas and

occupied areas. Install five-micron water filtration socks in all floor drains prior to sealing.

F. Where friable ACM is present, establish worker decontamination facility, critical barriers, and negative air filtration prior to conducting pre-cleaning activities. Pre-clean fixed objects within the work areas, using HEPA vacuum equipment and/or wet cleaning methods as appropriate, and enclose with minimum 6-mil plastic sheeting sealed with duct tape.

G. Pre-clean movable objects within the work areas, using HEPA vacuum equipment and wet cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

H. After HEPA vacuum pre-cleaning, conduct work area preparation in accordance with this Specification section.

I. Where fixed walls are not used, one layer of 6-mil polyethylene sheeting will be applied to a rigid framework of wood, metal, or PVC.

J. Install two layers of 4-mil polyethylene wall sheeting over all wall surfaces and critical barrier (where wall materials are not being removed as ACM). All overlaps must be sealed with tape or spray adhesive.

K. Cover all floors in the work area with two layers of 6-mil polyethylene sheeting (where flooring materials are not being removed as ACM). Extend the polyethylene flooring a minimum of 12 inches up the walls. Ensure that the wall sheeting overlaps the floor sheeting from the top.

L. Where containments extend above suspended or fixed ceilings, remove the ceiling as necessary to perform installation of isolation barriers and wall sheeting above ceiling. Wall sheeting must extend to the top of each wall in ceiling plenum areas.

M. Maintain emergency and fire exits from the work area, or establish alternative exits satisfactory to fire officials.

N. Create pressure differential between work areas and occupied areas by the use of acceptable negative air pressure equipment. The Contractor must ensure required negative air pressure is obtained throughout the containment and the total volume of air within the work area is changed every 15 minutes.

O. Install a manometer within each work area where Class I work will be performed to monitor the negative pressure within the work area.

P. Post all approaches to each work area with Asbestos Warning signs. Warning signs must be of size and type that are easily readable and are visible from all approaches to the work areas and adhere to regulatory requirements.

Q. Establish a work area access control log at the entrance to each work area. Authorized personnel entering the work area must sign in upon entering the area and sign out upon exiting the area.

R. Establish airless spray equipment within each work area. Airless spray equipment must be capable of reaching all areas within each work area.

3.4 CONTIGUOUS PERSONNEL DECONTAMINATION SYSTEM

A. The Contractor must establish contiguous to each work area, where feasible, a personnel decontamination system consisting of equipment room, shower room and

clean room in series. Access between the contaminated and uncontaminated areas must be through this decontamination enclosure only. The decontamination system must be constructed of two layers of 6-mil polyethylene sheeting. Prefabricated "pop-up" decontamination chambers will not be permitted on this project.

B. Access between rooms in decontamination system must be through double flap-curtained openings. Clean room, shower room and equipment room within decontamination system must be completely sealed ensuring that the sole source of air flow through this area originates from uncontaminated areas outside the work area.

C. The shower unit must be equipped with an adequate supply of warm water. A shower filtration pump containing two 5-micron sock filters, or the best available technology must be installed to filter shower water. Filtered shower water must be discharged into sanitation drains and must not be discharged into storm drains or onto floor or ground surfaces.

D. The shower room must have soap and an adequate supply of drying towels. Provide an adequate number of shower units in accordance with OSHA Title 29 CFR, Part 1926.1101, and Part 1910.141.

3.5 REMOTE PERSONNEL DECONTAMINATION SYSTEM

A. The Contractor must establish a remote personnel decontamination system where contiguous decontamination systems are not feasible. The use of a remote decontamination unit must be indicated on the State Notification of Asbestos Abatement and include an attached equipment room. Personnel must remove their contaminated work suits in the equipment room, then don clean work suits, and proceed to a shower that is not adjacent to the work area. Access between the contaminated and uncontaminated areas must be through this decontamination enclosure only. The decontamination system must be constructed of two layers of 6-mil polyethylene sheeting. Prefabricated "pop-up" decontamination chambers will not be permitted on this project.

B. Access between rooms in decontamination system must be through double flap-curtained openings. Clean room, shower room and equipment room within decontamination system must be completely sealed ensuring that the sole source of air flow through this area originates from uncontaminated areas outside the work area.

C. The shower unit must be equipped with an adequate supply of warm water. A shower filtration pump containing two 5-micron sock filters, or the best available technology must be installed to filter shower water. Filtered shower water must be discharged into sanitation drains and must not be discharged into storm drains or onto floor or ground surfaces.

D. The shower room must have soap and an adequate supply of drying towels. Provide an adequate number of shower units in accordance with OSHA Title 29 CFR, Part 1926.1101, and Part 1910.141.

3.6 WASTE LOAD OUT SYSTEMS

A. The Contractor may elect to establish waste load out systems, where feasible, attached to the work areas.

B. Waste load out systems must consist of a minimum of two chambers that are of suitable size for transporting waste out of the work area.

C. Waste load out systems must be constructed of two layers of 6-mil polyethylene sheeting.

D. Access between rooms in the waste load out system must be through double flap-curtained openings. The waste load out system must be used for decontaminating waste containers, bags, bundles, etc. prior to removal from the work area and transporting waste from the work area to the non-work area.

E. Persons working inside the contaminated work area are not permitted to pass from the work area to the non-work area through the waste load out system. Persons inside the contaminated work area must not be permitted to enter into the clean area of the waste load out system.

F. Waste load out systems must remain sealed at all times except during decontamination of waste containers and transport of waste from the work area to the non-work area.

3.7 WORK AREA EXHAUST

A. Install sufficient quantity of portable HEPA-filtered exhausts to maintain each interior work area, including the Decontamination Facility, under negative pressure, and to reduce airborne asbestos fiber concentrations.

B. The exhaust(s) must be capable of providing at least an inward velocity through any unsealed openings, including the Personnel Decontamination Facility, of at least 100 feet per minute (fpm), and provide at a minimum, four full air changes per hour throughout the work area.

C. All exhaust air must pass through a HEPA filter before being discharged to the exterior of the building.

D. Deficient air flows must be immediately reported, and work ceased until the situation is corrected.

E. Exhaust system must be operated constantly from the time that preparation is completed, until final air clearance certification is obtained.

F. The Contractor must install plywood window barriers (or similar) that will accommodate all negative pressure exhausts during abatement.

3.8 ASBESTOS REMOVAL PROCEDURES - GENERAL

A. The Contractor must have a designated "Competent Person" on the job at all times to ensure establishment of a proper enclosure system and proper work practices throughout the project. At a minimum, the Contractor’s Competent Person must perform or supervise the following duties, as applicable:

1. Ensure the integrity of the containment(s) or enclosure(s).

2. Set up procedures to control entry to and exit from the enclosure(s).

3. Supervise employee exposure monitoring.

4. Ensure that employees set up, use, and remove engineering controls, use work practices and personal protective equipment in compliance with applicable regulations and the technical specifications.

5. Ensure that employees use the worker decontamination facilities and observe decontamination procedures.

6. Supervise and direct abatement activities in a manner that meets the intent of this technical specification and applicable regulations.

7. Quantify asbestos waste generated during the project.

8. Perform final visual inspections in conjunction with the Asbestos Project Monitor.

B. Abatement work will not commence until all work area preparation is completed in accordance with this Specification and accepted by the Engineer.

C. Spray asbestos materials with amended water using airless spray equipment or apply approved removal wetting agent to reduce the release of fibers during removal operation. The Engineer will pre-approve use of amended water as the wetting agent.

D. Spraying of amended water must be adequate to allow the ACM to absorb the amended water. Actual removal of ACM must not be allowed until all ACM has become adequately wet.

E. Fill disposal containers as removal proceeds, seal filled containers before moving to waste load out system. Wet clean each container thoroughly, double bag, drum or use other approved containerization methods, and apply a caution label before moving to the holding area.

F. Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris.

G. Solidify all liquid waste prior to containerization for disposal.

H. Sealed disposal containers and all equipment used in the work area must be included in the cleanup and must be removed from work areas, via the waste load out system at an appropriate time in the cleaning sequence.

I. At any time during asbestos removal, should the Project Monitor and/or competent person suspect contamination of areas outside the work area(s), all abatement work must stop until steps to decontaminate these areas and eliminate causes of such contamination are completed. Unprotected individuals must be prohibited from entering suspected contaminated areas until air sampling and visual inspections certify decontamination.

J. Upon acceptance of the work area by the Engineer, the Contractor must apply an even coating of bridging encapsulant to all exposed surfaces contained within the work area. Apply encapsulant in accordance with manufacturer’s recommendation.

K. Re-occupancy air monitoring must be performed within each work area where greater than three linear feet or three-square feet of ACM has been removed.

3.9 ASBESTOS REMOVAL PROCEDURES – GLUE DAUBS

A. Prior to the removal, the Contractor must ensure the work area is prepped in accordance with Sections 3.3, 3.4, 3.6, and 3.7 of this Specification.

B. The Contractor must wet the wall tiles and glue daubs with amended water or detergent solution, so that entire surface is wet.

1. Do not allow water to puddle or run off into other areas.

2. If a detergent is used, use it in strict accordance with manufacturer's instructions.

C. Glue daubs are adhered to CMU, removal of adhesives from substrates may be required using hand and/or mechanical tools. Dispose of porous substrates (i.e., CMU,

brick concrete) as asbestos-contaminated waste. Continuously mist air during removal operations to ensure no visible emissions are generated during removal activities.

1. Continuously mist surfaces in area where work is occurring with amended water, removal encapsulant, or detergent solution.

2. Wet debris generated as necessary to keep continuously wet.

D. Remove materials, place in boxes, or wrap in felt, and place in labeled disposal bags.

1. At the Contractor's option, material may be placed directly into durable leak-tight containers.

E. The work area(s) are subject to a final visual inspection and re-occupancy air monitoring.

3.10 FINAL CLEANING AND ENCAPSULATION

A. Upon completion of gross removal of all ACM specified for removal, the Contractor must begin final cleaning of the effected work area. The final cleaning must include the following at a minimum:

1. The Contractor must HEPA-vacuum and wet wipe all surfaces contained within the work area during the final cleaning.

2. All tools or equipment that are not necessary for final cleaning must be decontaminated or bagged and removed from the work area enclosure.

3. The Contractor must begin final cleaning procedures at the furthest and highest most points from the personnel decontamination unit and move towards the unit. The Contractor must ensure that all exposed building components and/or surfaces are thoroughly HEPA vacuumed and wet wiped.

4. The Contractor must HEPA vacuum and wet wipe any component specified to remain inside the work area enclosure.

5. The Contractor must thoroughly wet wipe all polyethylene sheeting inside the work area enclosure.

B. Once all surfaces and components within the work area have been thoroughly cleaned, the Contractor’s Competent Person must perform a visual inspection of all surfaces and components within the work area enclosure.

1. The Contractor’s Competent Person must sign off on the work area stating that all abatement has been completed for that portion of work and that the work area has met final visual inspection requirements as outlined in ASTM E1368.

C. The Contractor’s Competent Person must then request a final visual inspection to be performed by the Engineer.

1. The Engineer must visually inspect all surfaces and components in the work area for residual debris and or dust.

2. Additional cleaning must be performed at the Contractor’s expense if the Engineer identifies visual debris and/or dust during the visual inspection.

3. Additional cleaning must be performed until the work area meets the Final Visual Inspection requirements outlined in ASTM E1368 and the NYDOL criteria of “no visible residue”.

D. Upon acceptance of the work area by the Engineer, the Contractor must apply an even layer of bridging or penetrating encapsulant to all surfaces contained within the work area.

1. The Engineer must verify the completeness of work area encapsulation.

3.11 WASTE PACKAGING AND REMOVAL PROCEDURE

A. The Contractor must strictly adhere to the requirements of this section and EPA, DOT, and DPH requirements for ACM waste packaging and transporting waste from the work area enclosure to the disposal dumpster.

B. Waste disposal bags and drums must be affixed with pre-printed OSHA warning labels, US Department of Transportation (DOT) labels, and NESHAP labels.

C. Each container of ACM waste must be made adequately wet prior to sealing the container. Bags must be sealed immediately following additional wetting procedures. Bags of ACM waste must not be permitted to remain unsealed while in the work area enclosure.

D. Each bag of ACM waste must be double bagged during waste load out procedures. The following waste load out procedure must be strictly adhered to:

1. Wet wipe inner bag or drum to remove all ACM contamination. Ensure the inner bag is sealed.

2. Transport bag or drum to the equipment room located in the worker decontamination enclosure.

3. One worker, equipped with personal protective equipment, must be inside the clean room of the worker decontamination enclosure.

4. The worker in the clean room of the decontamination enclosure must open a 6-mil disposal bag and hold it open inside the shower room where the inner bag containing the ACM waste must be placed.

5. The outer bag must be sealed with duct tape inside the shower room.

6. The double bagged or drummed waste must be removed from the decontamination enclosure and waste generator labels must be immediately affixed to the outer bag or drum.

7. Waste generator labels must be printed self-adhering labels and must contain the Owner’s name, the site location address, and the Contractor’s name.

8. The properly labeled waste must be transported directly to the lined waste container.

9. The waste container must be double-lined with 6-mil polyethylene sheeting.

10. OSHA warning signs must be secured to the waste container prior to any loading and unloading operations.

11. The waste container must be kept locked at all times other than loading and unloading.

3.12 DISPOSAL OF ASBESTOS AND ASBESTOS-CONTAMINATED WASTE

A. All disposal of asbestos-containing and/or asbestos-contaminated material must be in compliance with requirements of the NYSDOL, and the EPA NESHAP regulations.

B. Waste container storage locations must be pre-approved by the Owner and Engineer.

C. A copy of approved disposal authorization must be provided to the Owner and Engineer and any required federal, state, or local agencies.

D. Copies of all waste facility receipts will be retained by the Engineer as part of the project file. The receipts will be signed by the waste facility operator upon receipt, and the quantity of asbestos debris leaving the job site and arriving at the waste facility acknowledged.

E. All asbestos debris must be transported in covered, sealed vans, boxes, or dumpsters, which are physically isolated from the driver by an airtight barrier. All vehicles must be properly licensed to meet DOT requirements.

F. Friable ACM waste must be placed in double-lined enclosed waste containers equipped with a lockable hasp. Waste containers must be posted with OSHA warning signs during loading and unloading.

G. All liquid waste generated during the work must be solidified. At no time will liquid waste be permitted to be stored on site. Liquid waste generated during this project must be solidified prior to the end of each work shift.

H. Completed WSRs signed by the waste facility must be returned to the Owner and Engineer no later than 45 days from the time the waste was transported off-site. Completed WSRs that are not received by the Owner within 35 days must require the Contractor to begin tracking the waste. The Contractor must notify the Owner of intentions on tracking the waste.

I. The Contractor must take appropriate actions as outlined in Title 40 CFR, Part 61 NESHAP regulations when completed WSR are not forwarded to the Owner or Engineer within 45 days from the time the waste was transported off-site.

3.13 RE-OCCUPANCY AIR CLEARANCE SAMPLING – NOT REQUIRED

A. After the visual inspection is completed and all surfaces in the abatement area have dried, the Engineer must conduct final re-occupancy air clearance sampling.

1. Aggressive air monitoring will be used.

2. Selection of location and of samples must be the responsibility of the Engineer.

3. Air monitoring volumes must be sufficient to provide a detection limit of 0.002 f/cc (fibers per cubic centimeter of air) for Phase Contrast Microscopy (PCM) using NIOSH-approved method. For air clearance by Transmission Electron Microscopy (TEM), air monitoring volumes must be sufficient to provide a detection limit of 0.005 s/cc (structures per cubic centimeter of air) using the AHERA method.

B. Areas that do not comply with the Standard for Cleaning for Initial Clearance must continue to be cleaned by, and at, the Contractor's expense until the specified Standard of Cleaning is achieved, as evidenced by results of air testing results, as previously specified.

1. The above must include all Engineer-based costs.

C. The Contractor must properly schedule abatement work and other site activities at appropriate times and locations to prevent cross-contamination and/or dust in areas where the Asbestos Project Monitor will conduct air sampling.

D. After the pre-sealant, visual inspection has passed and all surfaces in the abatement area have dried, re-occupancy air clearance monitoring will be performed.

1. The primary and secondary barriers, worker decontamination enclosure, and negative air filtration units must remain in place.

2. At no time can tools, ladders, vacuums, or waste remain inside the work area enclosure during final air clearance sampling.

3.14 ENGINEER AIR SAMPLING RESPONSIBILITY

A. Air sampling may be conducted by the Engineer to ascertain the integrity of the controls that protect the building from asbestos contamination. Independently, the Contractor must monitor air quality within the work area to ascertain the protection of employees, and to comply with OSHA regulations.

B. The Engineer's project monitor may collect and analyze air samples during the following period:

1. Abatement Period – If required, or retained for this service, the Engineer's project monitor must collect samples on a daily basis during the work period. A sufficient number of area samples must be collected outside of the work area, at the exhaust of the negative pressure system, and outside of the building to evaluate the degree of cleanliness or contamination of the building during removal. At the discretion of the Asbestos Project Monitor, additional air samples may be collected inside the work area and decontamination enclosure system.

C. The Engineer's project monitor must collect and analyze air samples during the following period:

1. Post-Abatement Period – If required, the Asbestos Project Monitor must conduct air sampling following the final cleanup phase of the project, once the "no visible residue" criterion, as established by the Asbestos Project Monitor, has been met and the work area has been encapsulated by the Contractor.

D. Final re-occupancy air clearance sampling must be conducted by the Asbestos Project Monitor in accordance with the requirements of the NYSDOL using the following methods:

1. PCM – For work areas containing less than 500 linear feet or 1,500 square feet of ACM, post abatement analysis of the samples to determine if re-occupancy clearance standards have been met must be conducted by PCM. The project may be considered complete when the results of samples collected in the work area and analyzed by phase contrast microscopy using the most current NIOSH method 7400, to show that the concentration of fibers for <u>each</u> of the five samples is less than or equal to a limit of quantification for PCM (0.010 fibers per cubic centimeter of air).

E. The Owner must be responsible for payment for the initial final clearance air sampling performance, only.

1. If the first set of samples fails to satisfy the re-occupancy criteria, the Contractor must be responsible for payment of all costs associated with the additional final clearance air sampling and analysis.

F. The Asbestos Project Monitor may provide continual evaluation of the air quality of the building during removal, using their best professional judgment in respect to the EPA and NYSDOL guideline of 0.010 fibers/cc, and the background air quality established during the pre-abatement period.

G. Pre-abatement and abatement air samples must be collected as required to obtain a minimum volume of 1,200 liters. Samples must be analyzed by PCM NIOSH 7400 Method.

3.15 ENGINEER'S INSPECTION RESPONSIBILITIES

A. The Engineer must conduct inspections throughout the progress of the abatement project. Inspections must be conducted to document the abatement work progress, as well as the procedures and practices employed by the abatement Contractor.

B. The Engineer may perform the following inspections during the abatement activities:

1. Pre-commencement Inspection. Pre-commencement inspections will be performed at the time requested by the Contractor. The Engineer must be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor must perform the necessary adjustments to obtain compliance.

2. Work Area Inspections. Work area inspections must be conducted on a daily basis at the discretion of the Engineer. During the work inspections, the Engineer must observe the Contractor's removal procedures, verify barrier integrity, monitor negative air filtration devices, assess project progress, and if deficiencies are noted, inform the abatement Contractor of specific remedial activities.

C. The Engineer must perform the following inspections during the abatement activities:

1. Pre-sealant Inspection. Upon the request of the Contractor, the Engineer will conduct a pre-sealant inspection. The Engineer must be informed 24 hours prior to the time that the inspection is needed. The pre-sealant inspection must be conducted after completion of the initial cleaning procedures, but prior to encapsulation. The pre-sealant inspection must verify that all ACM and residual debris have been removed from the work area. If the Engineer identifies residual dust or debris during the pre-sealant inspection, the Contractor must comply with the request of the Engineer to render the area “dust free.”

2. Final Visual Inspection. Upon request of the abatement Contractor, the Engineer will conduct a final visual inspection. Following the removal of the inner layer of poly sheeting, but prior to final air clearance, the Engineer must conduct a final visual inspection inside the work area. If residual dust or debris is identified during the final inspection, the Contractor must comply with the request of the Engineer to render the area “dust free.”

Table 1 - LIST OF ASBESTOS-CONTAINING MATERIALS

MATERIAL	LOCATION(S)	APPROXIMATE QUANTITY*	COMMENTS
Wall Tile Glue Daubs	Blower Building – First Floor	4 SF	In locations where new pipe penetrations are to be drilled.

* Approximate quantities included in this Table are provided to establish an order of magnitude for the amount of material that must be abated. Actual quantities may vary. It is the sole responsibility of the Contractor to visit the site, review the Contract Documents and determine the quantities of ACM to be removed when developing their Bid.

Legend
ACM = Asbestos-Containing Materials
SF = Square Feet

END OF SECTION

QuES&T
Quality Environmental Solutions & Technologies, Inc.

PRE-RENOVATION ENVIRONMENTAL SURVEY REPORT FOR ASBESTOS-CONTAINING MATERIALS (ACM) & LEAD-BASED PAINT (LBP)

Prepared for:
TIGHE & BOND
1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484

at

BEACON WASTEWATER TREATMENT PLANT
BLOWER BUILDING
96 Dennings Avenue
Beacon, NY 12508

September 7th, 2025

QuES&T Project #256929

1376 Route 9, Wappingers Falls, NY 12590 Phone (845) 298-6031 Fax (845) 298-6251
NYS MWBD MBE Cert # 49952-2006 NYSUCP DBE Certified NJUCP DBE Certified www.Qualityenv.com

QuES&T

Quality Environmental Solutions & Technologies, Inc.

September 7th, 2025

Tighe & Bond
1000 Bridgeport Ave, 3rd Floor
Shelton, CT 06484

ATTN: Lori Carriero

Via E-mail: lcarriero@tighebond.com

Re: Beacon WWTP – Blower Building
Pre-Renovation Environmental Survey
QuES&T Project #256929

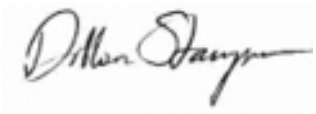
Dear Ms. Carriero,

Attached is the Pre-Renovation Inspection Report for Asbestos-containing Materials (ACM) and Lead-Based Paints (LBP) identified throughout areas included within the above-referenced location(s) by **Qu**ality **E**nvironmental **S**olutions **& T**echnologies, Inc. **(QuES&T)**. The inspection included visual assessment of the location in question, and representative sampling, as required, in compliance with the requirements of all applicable federal, state, and local regulations.

The attached report summarizes the inspection protocol and inspection results for your review. **QuES&T** believes this report accurately reflects the material condition existing in the functional spaces at the time of our inspection.

Should you wish to discuss this matter further or require additional information concerning this submittal, please contact us at (845) 298-6031. **QuES&T** appreciates the opportunity to assist Tighe & Bond in the environmental services area.

Sincerely,



Dillon Stamper
Field Technician
NYS/AHERA Inspector/Project Monitor
Cert. #AH 24-6LUH4-SHAB
Niton-Certified XRF Technician

QuES&T

Quality Environmental Solutions & Technologies, Inc.

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EXECUTIVE SUMMARY

Quality **E**nvironmental **S**olutions & **T**echnologies, Inc. (**QuES&T**) was retained by Tighe & Bond to conduct a Pre-Renovation Survey for the presence of Asbestos-containing Materials (ACM) and Lead-based Paints (LBP) in support of future renovations to the Blower Building at the Beacon Wastewater Treatment Plant, located at 96 Dennings Ave, Beacon, NY 12508.

The survey included a visual inspection/assessment for suspect hazardous material(s), as detailed above, which are likely to be affected by planned demolition/renovations/construction activities. Inspection and sampling were limited to areas/materials slated for demolition/renovation/construction.

The survey was conducted by **QuES&T** personnel on August 22nd, 2025. Asbestos and Lead inspections and/or sampling were conducted by NYSDOL Asbestos Inspector(s) Dillon Stamper (Cert. #AH 24-6LUH4-SHAB), and Jessica Lopez (Cert. #AH 25-6AJ9Y-SHAB). The lead survey was conducted by Dillon Stamper, utilizing paint chip analysis for Total Lead concentration.

ASBESTOS
Laboratory analysis and/or existing sampling data indicated the following materials as Asbestos-containing Materials (greater than 1% asbestos) **(Refer to Table I & Appendix A for details and locations)**

- ***Mudded Joint Packing on Large Diameter Metal Piping***
- ***Packing on Suspended Tank Body***
- ***Sealant on Roof Piping***
- ***Glue Dab on Acoustical Wall Tile to Wall***
- ***Skim Coat Plaster on Window Frames***

LEAD
Based on review of the data generated by laboratory analysis for Total Lead, the following surfaces within the scope of work were identified as lead-based as defined by HUD/EPA (equal to or in excess of 0.5% by weight) (**Refer to Table II & Appendix C for details**):

- ***Green Metal Piping***

It should be noted that several components tested did in fact contain minimal lead-levels below the EPA threshold level of 0.5% by weight for classification as Lead-Based Paint (LBP) and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

1.0 INTRODUCTION:

Quality **E**nvironmental **S**olutions **&** **T**echnologies, Inc. **(QuES&T)** performed a Pre-Renovation Survey for the presence of Asbestos-containing Materials (ACM) and Lead-based Paint (LBP) in conformance with the requirements of all applicable federal, state, and local regulations. The survey included a visual inspection/assessment, and representative sampling of suspect hazardous materials, as required,

throughout accessible interior and exterior locations to be affected by future renovations of the Beacon Wastewater Treatment Plant Blower Building, located at 96 Dennings Ave, Beacon, NY 12508.

Certified **QuES&T** personnel, Jessica Lopez and Dillon Stamper conducted field inspection(s) on August 22nd, 2025.

QuES&T established functional spaces based either on physical barriers (i.e. walls, doors, etc.) or homogeneity of material. Within each functional space identified, a visual inspection was performed using reasonable care and judgment, to identify and assess location, quantity, friability, and/or condition, as applicable, of all accessible installed building materials observed at the affected portion of the building/structure.

Limited localized demolition of building surfaces was performed, as part of this survey, to access concealed surfaces. No disassembly of installed equipment was conducted as part of this inspection. ACM and LBP concealed within structural components and equipment interiors or that is accessible only through extensive mechanical or structural demolition may not have been identified as part of this survey.

Homogenous material types were established based on appearance, color and texture. The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. The findings and conclusions of this report are not meant to be indicative of future conditions at the site and does not warrant against conditions that were not evident from visual observations or historical information obtained from others.

2.0 ASBESTOS SURVEY:

2.1 INSPECTION SUMMARY

QuES&T performed a Pre-Renovation Survey, in conformance with Title 12 NYCRR Part 56-5.1, for Tighe & Bond in support of future renovations to the Blower Building at the Beacon Wastewater Treatment Plant, located at 96 Dennings Ave, Beacon, NY 12508. The survey included a visual inspection / assessment for Presumed Asbestos-containing Materials (PACM) and suspect miscellaneous Asbestos-containing Materials (ACM) throughout accessible interior and exterior locations to be affected by future renovations, as detailed above.

Limited localized demolition of building surfaces was performed, as part of this survey, to access concealed surfaces. No disassembly of installed equipment was conducted as part of this inspection. ACM concealed within structural components and equipment interiors or that is accessible only through extensive mechanical or structural demolition may not have been identified as part of this survey. When any construction activity, such as demolition, remodeling, renovation or repair work, reveals PACM or suspect miscellaneous ACM that has not been identified, as part of this survey, all construction activities shall cease in the affected area.

The survey included both visual inspection of accessible spaces and representative sampling of suspect building materials for ACM. Samples collected were analyzed by a laboratory approved under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP). Samples were analyzed in the laboratory by Polarized Light Microscopy (PLM), Polarized Light Microscopy-NOB (PLM-NOB) and/or Quantitative Transmission Electron Microscopy (QTEM), as required. Sample collection and laboratory analysis were conducted in compliance with the requirements of Title 12 NYCRR Part 56-5.1, 29 CFR 1926.1101 and standard EPA & OSHA accepted methods. Samples consisting of multiple layers were separated and analyzed independently in the laboratory.

2.2 SAMPLE COLLECTION & ANALYTICAL PROCEDURES

Representative bulk sampling was performed on suspect building materials for laboratory analysis using PLM, PLM-NOB, and/or QTEM. The following is a summary of installed building materials sampled:

- Wall Materials – Skim Coat Plaster, CMU, Mortar, Brick.
- Ceiling Materials – Concrete.
- Flooring Materials – Slab.
- Roofing Materials – Tar, Perlite, Built Up Roof, ISO Foam, EPDM.
- Thermal System Insulation Materials (TSI) – Packing, Mudded Joint Packing, Pipe Insulation.
- Miscellaneous Materials – Caulk, Sealant, Tar, Insulated Backing, Glue Dab.

Certified **QuES&T** personnel (Appendix D), Jessica Lopez (Cert. #AH 25-6AJ9Y-SHAB) and Dillon Stamper (Cert. #AH 24-6LUH4-SHAB) performed visual assessments throughout interior and exterior construction areas. A total of Seventy-Three **(73)** samples of installed and accessible suspect building materials were analyzed by a laboratory approved under the NYSDOH ELAP. Thirty-Three (**33**) samples were analyzed using Polarized Light Microscopy (PLM) for friable materials; Twenty-Two (**22**) samples were analyzed using Polarized Light Microscopy (PLM-NOB) for non-friable organically bound materials; and Eighteen (**18**) samples were analyzed by Confirmatory-QTEM following negative-determinations using PLM-NOB protocols.

2.3 IDENTIFIED ASBESTOS-CONTAINING MATERIALS (ACM)

TABLE I: IDENTIFIED ACM
Beacon Wastewater Treatment Plant Blower Building
96 Dennings Avenue
Beacon, NY 12508
(Refer to Appendix A for details)

KEY: **ACM** = Materials containing greater than 1% of asbestos;
LF = Linear Feet; **SF** = Square Feet; **PACM** = Presumed Asbestos-containing Materials;
Friable = ACM capable of being released into air, and which can be crumbled, pulverized, powdered, crushed or exposed by hand-pressure.

Location	Material	Approximate Quantity	Friable?	Condition
Interior Windows, Sill & Surrounding Frame, On CMU	Skim Coat Plaster	25 SF	Yes	Damaged
First Floor, Suspended Tank, Body	Packing	150 SF	Yes	Good
First Floor, Large Diameter Pipe on Suspended Tank, On Wire Lathe	Mudded Joint Packing	20 SF	Yes	Good
Large Diameter Elbow to Roof Penetration Curb	Sealant	2 SF	No	Good
First Floor, Interior Walls, 12”x12” Tile to CMU	Glue Dabs	1,650 SF	Yes	Good

3.0 LEAD SURVEY:

3.1 INSPECTION SUMMARY

QuES&T conducted a Limited Pre-Renovation Lead Survey, throughout specific interior and exterior areas of the Beacon Wastewater Treatment Plant Blower Building, located at 96 Dennings Ave, Beacon, NY 12508 in support of future renovations. The survey was limited to specific accessible, representative building components & immovable objects, potentially affected by scheduled renovation/construction activities.

Technician(s) Dillon Stamper of **QuES&T**, collected a total of Five **(5)** paint ship samples on August 22nd, 2025.

3.2 IDENTIFIED LEAD-BASED PAINT(S) (LBP)

Based on review of the data generated by Total Lead analysis, the following surfaces tested were identified as lead-based as defined by HUD/EPA (equal to or in excess of 0.5% by weight):

TABLE II: IDENTIFIED LEAD-BASED PAINT
Beacon Wastewater Treatment Plant Blower Building
96 Dennings Avenue
Beacon, NY 12508
(Refer to Appendix B for details)

Location	LBP Component	Substrate	Color	LBP Condition	Approximate Quantity
Main Floor	Piping	Metal	Green	Intact	200 SF

NOTE: Locations and quantities of identified LBP's are limited to areas potentially affected by future renovation activities. Surfaces/components with LBP's may exist in other spaces not included in this scope of work.

It should be noted that several components tested did in fact contain minimal lead-levels below the EPA threshold level of 0.5% by weight for classification as Lead-Based Paint (LBP) and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

4.0 RECOMMENDATIONS:

4.1 ASBESTOS

All construction personnel as well as individuals who have access to locations where asbestos containing materials (ACM) exists should be informed of its presence and the proper work practices in these areas. Conspicuous labeling of all ACM is suggested to ensure personnel is adequately informed. Personnel should be informed not to rest, lean or store material or equipment on or near these surfaces and not to cut, saw, drill, sand or disturb ACM. All removal, disturbance, and repair of ACM should be performed in compliance with Title 12 NYCRR Part 56 by persons properly trained to handle ACM. Facility custodial

and maintenance personnel should receive training commensurate with their work activities; as defined in 29 CFR 1910.1001.

As specified in Title 12 NYCRR Part 56-5.1 (h) and (i), "If the building/structure asbestos survey finds that the portion of the building/structure to be demolished, renovated, remodeled, or have repair work contains ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material, which is impacted by the work, the owner or the owner's agent shall conduct, or cause to have conducted, asbestos removal performed by a licensed asbestos abatement contractor in conformance with all standards set forth in this Part. All ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material impacted by the demolition, renovation, remodeling or repair project shall be removed as per this Part, prior to access or disturbance by other uncertified trades or personnel. No demolition, renovation, remodeling or repair work shall be commenced by any owner or the owner's agent prior to the completion of the asbestos abatement in accordance with the notification requirements of this Part…All building/structure owners and asbestos abatement contractors on a demolition, renovation, remodeling, or repair project, which includes work covered by this part, shall inform all trades on the work site about PACM, ACM, asbestos material and suspect miscellaneous ACM…Bids may be advertised and contracts awarded for demolition, remodeling, renovation, or repair work, but no work on the current intermediate portion of the project shall commence on the demolition, renovation, remodeling or repair work by any owner or agent prior to completion of all necessary asbestos abatement work for the current intermediate portion of the entire project, in conformance with all standards set forth in this Part."

Prior to conducting demolition or construction work at the building, all ACM affected/impacted by such activities shall be removed utilizing a licensed asbestos abatement contractor and NYSDOL/EPA/NYC certified personnel prior to construction/demolition activities. All work conducted should be in accordance with all legal requirements, including but not limited to U.S. Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) [40 CFR Part 61], New York State Industrial Code Rule 56 Asbestos Regulations (ICR 56) and Chapter 1 of Title 15 of the Rules of the City of New York Regulations, as applicable. Advance notification of the asbestos project to the USEPA, NYSDOL, and NYCDEP may be required.

All suspect building materials not sampled during this survey should be considered ACM until these materials are sampled and analyzed for ACM in the laboratory. Concealed ACM: In addition to the ACMs identified at the site, there is a possibility that concealed ACM may exist at the subject facility. As such, if any concealed suspect ACM is encountered during future construction related activities, the work should immediately stop. Prior to resuming the work, the suspect ACM should either be 1) Sampled by an appropriately-certified asbestos professional and submitted to an Approved NYSDOH ELAP laboratory for asbestos analysis or 2) Presumed to be ACM (PACM) and removed by a licensed asbestos abatement contractor for disposal in accordance with all applicable regulations.

4.2 LEAD

In addition to any identified Lead-based Paints (LBP), several components tested did in fact contain minimal lead-levels below the EPA threshold level of 0.5 mg/kg for classification as LBP and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

Activities involving the disturbance of LBP in homes, child-occupied facilities, and/or pre-schools built before 1978 must follow the requirements outlined by EPA regulations (40 CFR 745).

In areas where demolition and/or renovations are to occur and lead is present, the demolition debris waste stream should be further analyzed during segregation for compliance with EPA regulations to ensure proper disposal. TCLP testing can be performed prior to waste segregation, but results may not be indicative of the actual waste streams produced during demolition.

5.0 DISCLAIMERS

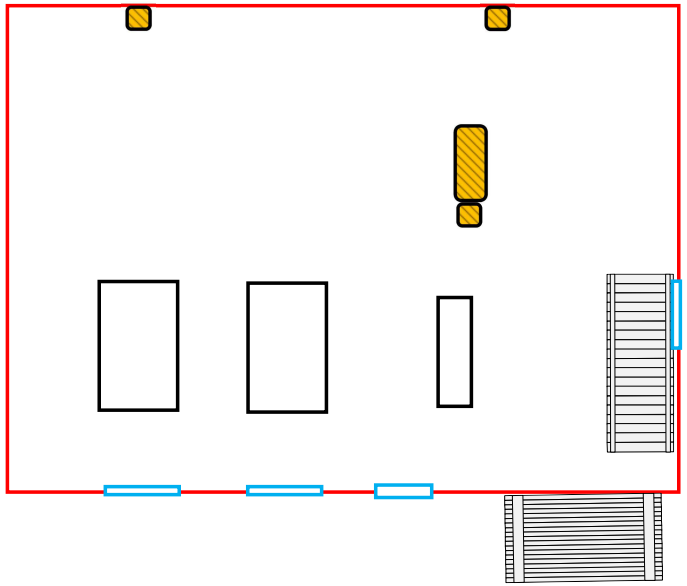
The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. Conditions may have changed since that time, and the findings and conclusions of this report are not meant to be indicative of future conditions at the Site. This report does not warrant against conditions that were not evident from visual observations or historical information obtained, or conditions that could only be determined by physical sampling or other intrusive investigation techniques that are outside the proposed scope of work.

It should be noted that the information contained within this report is based solely upon site observations and the results of laboratory analysis for samples collected by **QuES&T.** These observations and results are time dependent, subject to changing site conditions and revisions to Federal, State and Local regulations. **QuES&T** warrants that these findings have been promulgated after being prepared in general accordance with generally accepted practices in the abatement industries. **QuES&T** also recognizes that inspection laboratory data is not usually sufficient to make all abatement and management decisions.

Due to the potential for concealed Asbestos-containing Materials (ACM) or other regulated materials, this report should not be construed to represent all ACM or regulated materials within the site(s). All quantities of ACM or other regulated materials identified, and all dimensions listed within this report are approximate and should be verified On-site.

This inspection report is not intended to be used as the sole basis for soliciting pricing for regulated materials abatement. An abatement plan, specifications, drawing and/or Variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project. The Linear and/or Square Footages (LF / SF) listed within this Report are only approximates. Abatement Contractor(s) are required to visit the building(s) in order to take actual field measurements within each listed location.

Appendix A:
ASBESTOS SAMPLE LOCATIONS



ACM LOCATION KEY	
	ACM Glue Dab
	ACM Skim Coat Plaster
	ACM Packing & ACM MJP

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 9/5/2025	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

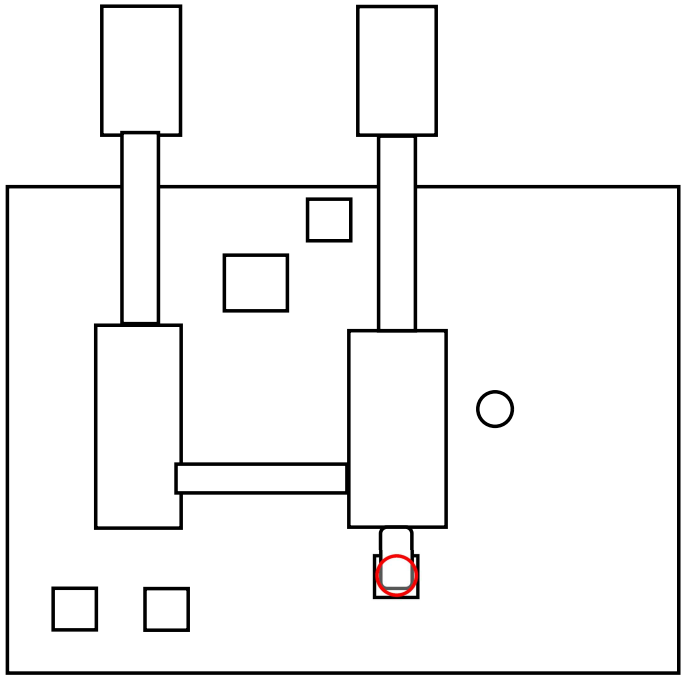
Tighe & Bond
1000 Bridgeport Avenue, 3rd Floor,
Shelton, CT 06484

PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

Interior ACM Locations

ACM-01



ACM LOCATION KEY	
○	ACM Sealant

Drawing Not to Scale
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Date: 9/5/2025	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

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1000 Bridgeport Avenue, 3rd Floor,
Shelton, CT 06484

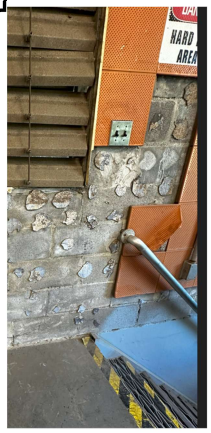
PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

Roof ACM Location

ACM - 02

1



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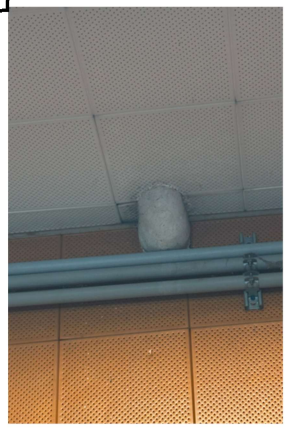

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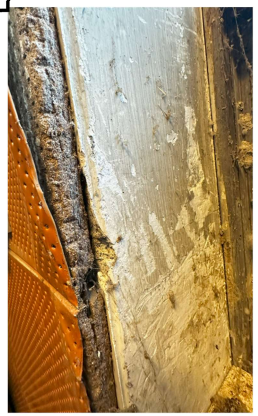

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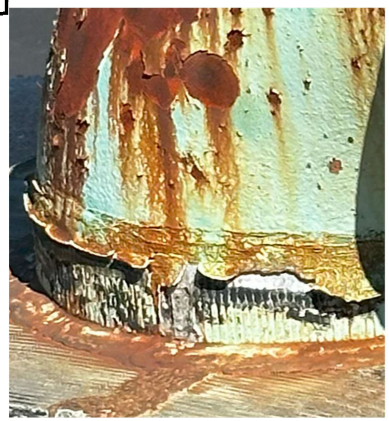

6

1. ACM Glue Dab - Acoustical Wall Tile to CMU
2. ACM Mudded Joint Packing - Extending through Suspended Ceiling
3. ACM Packing/MJP - Tank Body Packing and Large Diameter Pipe ACM Mudded Joint Packing
4. ACM Skim Coat Plaster - On Interior Window Frames & Sills
5. ACM Sealant - Roof, On large Diameter Pipe to Roof Curb
6. Total Lead Positive Green Paint - On Large Diameter Pipe

Date: 9/5/2025	**Version #** 1
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QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

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Shelton, CT 06484

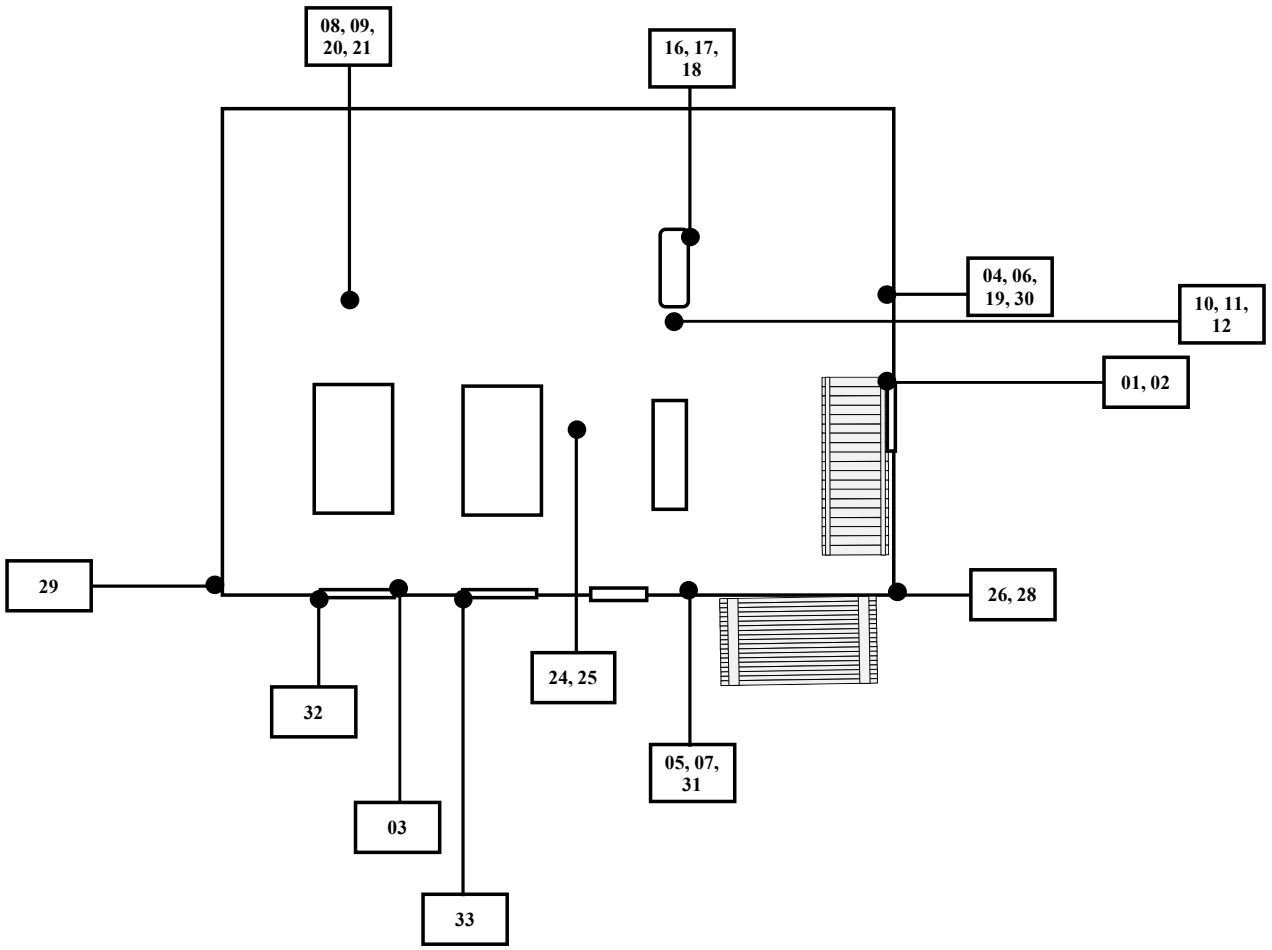
PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

Representative Photos of Identified ACM Materials

PHOTO - 01

Appendix B:
SAMPLE LOCATION DRAWINGS & ANALYTICAL DATA



SAMPLE LOCATION KEY	
●	Sample Location

Drawing Not to Scale

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Date: 8/22/2025	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

QuES&T

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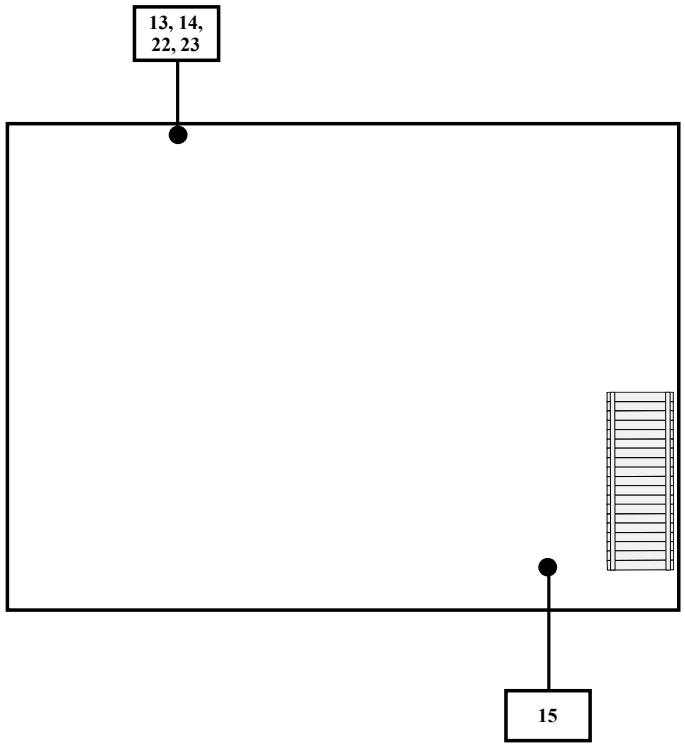
Shelton, CT 06484

PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

First Floor Sample Locations

SL-01



SAMPLE LOCATION KEY	
●	Sample Location

Drawing Not to Scale
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Date: 8/22/2025	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

QuES&T

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CLIENT

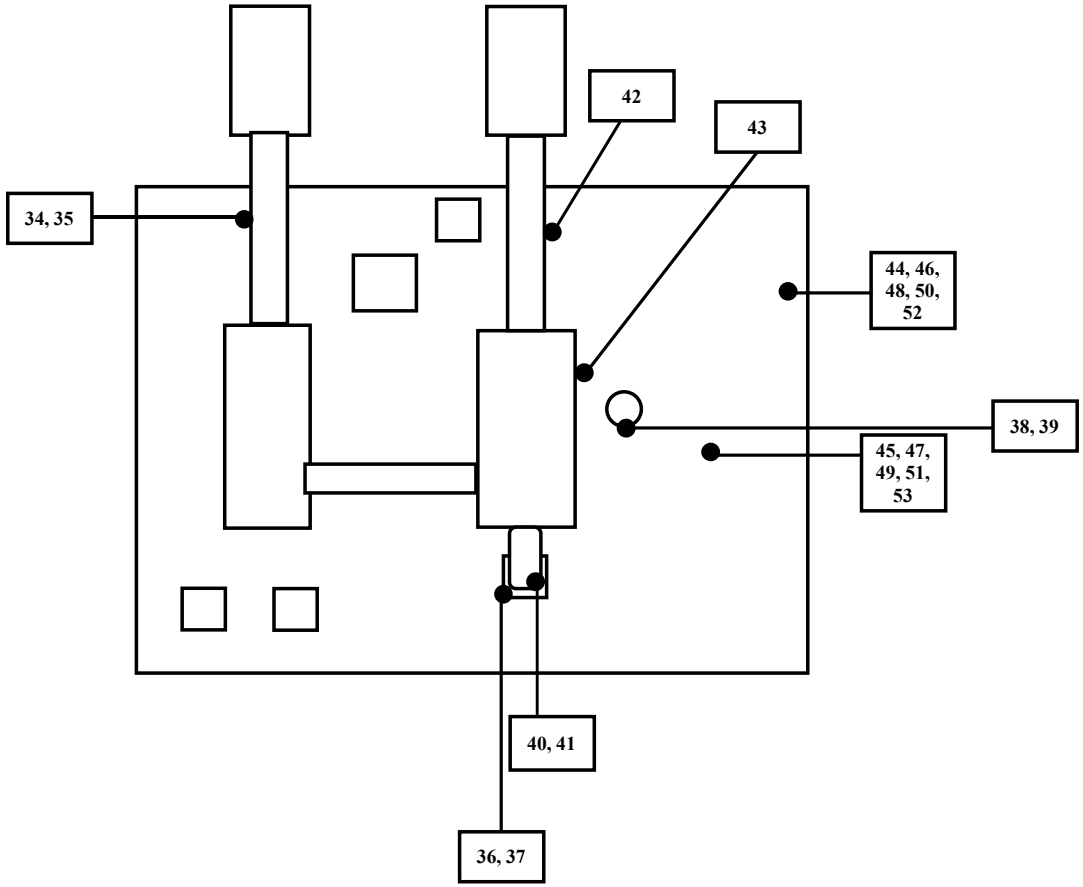
Tighe & Bond
1000 Bridgeport Avenue, 3rd Floor,
Shelton, CT 06484

PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

Basement Floor Sample Locations

SL-02



SAMPLE LOCATION KEY	
●	Sample Location

Drawing Not to Scale
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Date: 8/22/2025	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 25-6929	
Project Manager: RWL	**Prepared By:** DS

QuES&T

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CLIENT

Tighe & Bond
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Shelton, CT 06484

PROJECT LOCATION

Beacon Waste Water Treatment Plant
96 Dennings Ave
Beacon, NY 12508

Roof Sample Locations

SL-03

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-01	6929-02	6929-03	6929-04
Layer Number					
Lab ID Number		3112088	3112089	3112090	3112091
Sample Location		1st Floor, Interior Windows, Sill & Surrounding Frame, On CMU	1st Floor, Interior Windows, Sill & Surrounding Frame, On CMU	1st Floor, Interior Windows, Sill & Surrounding Frame, On CMU	1st Floor, Wall, On CMU
Sample Description		Skim Coat Plaster	Skim Coat Plaster	Skim Coat Plaster	Mortar
Method of Quantification		Point Count	Point Count	Point Count	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	White	White	White	Gray
Sample Treatment		None	None	None	None
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	1.3	1.2	1.3	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	1.3	1.2	1.3	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	ND	ND	ND	30.0
	% Carbonates	ND	ND	ND	25.0
	% Other	ND	ND	ND	ND
	% Unidentified	98.7	98.8	98.7	45.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-05	6929-06	6929-07	6929-08
Layer Number					
Lab ID Number		3112092	3112093	3112094	3112095
Sample Location		1st Floor, Wall, On CMU	1st Floor, Wall, Behind Acoustic Wall Tile	1st Floor, Wall, Behind Acoustic Wall Tile	1st Floor, Above Suspended Ceiling, Ceiling Deck
Sample Description		Mortar	CMU	CMU	Concrete
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	Yes	No	No	No
	Fibrous	No	No	No	No
	Color	Gray	Gray/Black	Gray/Black	Gray
Sample Treatment		None	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	30.0	25.0	25.0	20.0
	% Carbonates	25.0	25.0	25.0	30.0
	% Other	ND	ND	ND	ND
	% Unidentified	45.0	50.0	50.0	50.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-09	6929-10	6929-11	6929-12
Layer Number					
Lab ID Number		3112096	3112097	3112098	3112099
Sample Location		1st Floor, Above Suspended Ceiling, Ceiling Deck	1st Floor, Large Diameter Pipe on Suspended Tank, On Wire Lath	1st Floor, Large Diameter Pipe on Suspended Tank, On Wire Lath	1st Floor, Large Diameter Pipe on Suspended Tank, On Wire Lath
Sample Description		Concrete	Mudded Joint Packing	Mudded Joint Packing	Mudded Joint Packing
Method of Quantification		Scanning Option	Point Count	Point Count	Point Count
Appearance	Layered	No	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	No	Yes	Yes	Yes
	Color	Gray	Gray/Brown	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	3.1	2.9	2.7
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	3.1	2.9	2.7
Other Fibrous Materials Present	% Fibrous Glass	ND	11.5	10.7	10.0
	% Cellulose	ND	23.1	21.4	20.0
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	20.0	ND	ND	ND
	% Carbonates	35.0	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	45.0	62.3	65.0	67.3

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

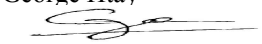
Sample ID Number		6929-13	6929-14	6929-15	6929-16
Layer Number					
Lab ID Number		3112100	3112101	3112102	3112103
Sample Location		Basement, On Metal Pipe Fitting	Basement, On Metal Pipe Fitting	Basement, On Metal Pipe Fitting	1st Floor, Suspended Tank, Body
Sample Description		Mudded Joint Packing	Mudded Joint Packing	Mudded Joint Packing	Packing
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Point Count
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray	Gray	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	5.0
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	5.0
Other Fibrous Materials Present	% Fibrous Glass	30.0	35.0	20.0	10.0
	% Cellulose	ND	ND	10.0	25.0
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	10.0	10.0	10.0	ND
	% Carbonates	25.0	25.0	25.0	ND
	% Other	ND	ND	ND	ND
	% Unidentified	35.0	30.0	35.0	60.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature : 
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage  ,Lab Director

Sample ID Number		6929-17	6929-18	6929-19	6929-20
Layer Number					
Lab ID Number		3112104	3112105	3112106	3112107
Sample Location		1st Floor, Suspended Tank, Body	1st Floor, Suspended Tank, Body	1st Floor, Ceiling, Splined, Back of Acoustic Ceiling Tile	1st Floor, Ceiling, Splined, Back of Acoustic Ceiling Tile
Sample Description		Packing	Packing	Insulated Backing	Insulated Backing
Method of Quantification		Point Count	Point Count	Scanning Option	Scanning Option
Appearance	Layered	Yes	No	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray/Brown	Gray	Brown	Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	5.3	8.9	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	5.3	8.9	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	9.3	22.2	ND	ND
	% Cellulose	26.7	ND	25.0	30.0
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	ND	ND	10.0	10.0
	% Carbonates	ND	ND	ND	ND
	% Other	ND	ND	15.0 Perlite	15.0 Perlite
	% Unidentified	58.7	68.9	50.0	45.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-21	6929-22	6929-23	6929-24
Layer Number					
Lab ID Number		3112108	3112109	3112110	3112111
Sample Location		1st Floor, Above Suspended Ceiling, On Metal Pipe	Basement, On Metal Pipe	Basement, On Metal Pipe	1st Floor, Floor
Sample Description		Pipe Insulation	Pipe Insulation	Pipe Insulation	Slab
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	No
	Color	Yellow/White/Silver /Green	Yellow/White/Silver /Green	Yellow/White/Silver /Green	Gray
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	40.0	45.0	35.0	ND
	% Cellulose	20.0	15.0	15.0	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	10.0	10.0	10.0	20.0
	% Carbonates	ND	ND	ND	30.0
	% Other	ND	ND	ND	ND
	% Unidentified	30.0	30.0	40.0	50.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

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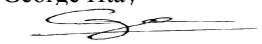
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature : 
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage  ,Lab Director

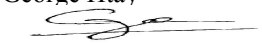
Sample ID Number		6929-25	6929-26	6929-27	6929-28
Layer Number					1
Lab ID Number		3112112	3112113	3112114	3112115
Sample Location		1st Floor, Floor	Exterior, Foundation to Facade Wall	Exterior, Foundation to Facade Wall	Exterior, Facade
Sample Description		Slab	Concrete	Concrete	Brick & Mortar (Brick Layer)
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	No	No	No
	Homogenous	No	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Gray	Gray/Brown	Gray/Brown	Red
Sample Treatment		Homogenized	None	None	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	25.0	30.0	30.0	25.0
	% Carbonates	30.0	20.0	25.0	ND
	% Other	ND	ND	ND	ND
	% Unidentified	45.0	50.0	45.0	75.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature : 
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage  ,Lab Director

Sample ID Number		6929-28	6929-29	6929-29	6929-46
Layer Number		2	1	2	
Lab ID Number		3112115	3112116	3112116	3112117
Sample Location		Exterior, Facade	Exterior, Facade	Exterior, Facade	Exterior, Roof, Field, 4th Layer, On Tar
Sample Description		Brick & Mortar (Mortar Layer)	Brick & Mortar (Brick Layer)	Brick & Mortar (Mortar Layer)	Perlite
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	Yes	No	Yes	No
	Fibrous	No	No	No	Yes
	Color	Gray	Red	Gray	Brown
Sample Treatment		None	Homogenized	None	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	5.0
	% Cellulose	ND	ND	ND	5.0
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	25.0	25.0	30.0	10.0
	% Carbonates	25.0	ND	25.0	ND
	% Other	ND	ND	ND	25.0 Perlite
	% Unidentified	50.0	75.0	45.0	55.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/28/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-47
Layer Number		
Lab ID Number		3112118
Sample Location		Exterior, Roof, Field, 4th Layer, On Tar
Sample Description		Perlite
Method of Quantification		Scanning Option
Appearance	Layered	No
	Homogenous	No
	Fibrous	Yes
	Color	Brown
Sample Treatment		Homogenized
Asbestos Content	% Amosite	ND
	% Chrysotile	ND
	% Other	ND
	% Total Asbestos	ND
Other Fibrous Materials Present	% Fibrous Glass	10.0
	% Cellulose	5.0
	% Other	ND
	% Unidentified	ND
Non-Fibrous Materials Present	% Silicates	10.0
	% Carbonates	ND
	% Other	20.0 Perlite
	% Unidentified	55.0

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		6929-30	6929-31	6929-32	6929-33
Layer Number					
Lab ID Number		3110423	3110424	3110425	3110426
Sample Location		1st Floor, Wall, 12" x 12" Acoustic Wall Tile to CMU	1st Floor, Wall, 12" x 12" Acoustic Wall Tile to CMU	Exterior, Windows, Frame to Brick, White	Exterior, Windows, Frame to Brick, White
Sample Description		Glue Dab	Glue Dab	Caulk	Caulk
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Brown	Brown	White	White
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	< 0.5	< 0.5	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	< 0.5 Inconclusive	< 0.5 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	43.9	46.9	21.6	21.8
	% Carbonates	6.3	2.9	50.4	47.6
	% Other Inorganic	49.8	50.2	28.0	30.6

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		6929-34	6929-35	6929-36	6929-37
Layer Number					
Lab ID Number		3110427	3110428	3110429	3110430
Sample Location		Exterior, Roof, Large Diameter Pipe Support Pad, Black	Exterior, Roof, Large Diameter Pipe Support Pad, Black	Exterior, Roof, Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge	Exterior, Roof, Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge
Sample Description		Tar	Tar	Caulk	Caulk
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	85.9	86.7	43.5	38.3
	% Carbonates	5.8	3.8	47.3	50.5
	% Other Inorganic	8.3	9.5	9.2	11.2

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		6929-38	6929-39	6929-40	6929-41
Layer Number					
Lab ID Number		3110431	3110432	3110433	3110434
Sample Location		Exterior, Roof, On Metal Vent, Faded Brown	Exterior, Roof, On Metal Vent, Faded Brown	Exterior, Roof, Large Diameter Elbow to Roof Penetration Curb	Exterior, Roof, Large Diameter Elbow to Roof Penetration Curb
Sample Description		Tar	Tar	Sealant	Sealant
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	Yes	Yes
	Homogenous	Yes	Yes	No	No
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	White/Green/Black	White/Green/Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	1.3	1.3
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	1.3	1.3
Other Materials Present	% Organic	87.6	87.7	25.8	27.2
	% Carbonates	3.9	3.7	65.7	66.3
	% Other Inorganic	8.5	8.6	7.2	5.2

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		6929-42	6929-43	6929-44	6929-45
Layer Number					
Lab ID Number		3110435	3110436	3110437	3110438
Sample Location		Exterior, Roof, Large Diameter Pipe, Support Pad, Gray	Exterior, Roof, Large Diameter Pipe, Support Pad, Gray	Exterior, Roof, Field, Bottom Layer (5th), On Concrete	Exterior, Roof, Field, Bottom Layer (5th), On Concrete
Sample Description		Tar	Tar	Tar	Tar
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	60.1	61.0	85.4	73.0
	% Carbonates	31.3	31.8	5.6	9.6
	% Other Inorganic	8.6	7.2	9.0	17.4

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		6929-48	6929-49	6929-50	6929-51
Layer Number					
Lab ID Number		3110439	3110440	3110441	3110442
Sample Location		Exterior, Roof, Field, 3rd Layer, On Perlite	Exterior, Roof, Field, 3rd Layer, On Perlite	Exterior, Roof, Field, 2nd Layer, On Built Up Roof	Exterior, Roof, Field, 2nd Layer, On Built Up Roof
Sample Description		Built Up Roof	Built Up Roof	ISO Foam	ISO Foam
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Yellow	Yellow
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND	ND
Other Materials Present	% Organic	79.3	74.4	99.5	99.0
	% Carbonates	7.0	8.2	0.4	0.8
	% Other Inorganic	13.7	17.4	0.1	0.2

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 08/27/2025
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0 (Testing)
NVLAP Lab Code : 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-52	6929-53
Layer Number			
Lab ID Number		3110443	3110444
Sample Location		Exterior, Roof, Field, Top Layer, On ISO Foam	Exterior, Roof, Field, Top Layer, On ISO Foam
Sample Description		EPDM	EPDM
Analytical Method		NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes
	Homogenous	No	No
	Fibrous	Yes	Yes
	Color	Black	Black
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	96.3	95.5
	% Carbonates	2.0	2.4
	% Other Inorganic	1.7	2.1

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 09/04/2025
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-30	6929-31	6929-32	6929-33
Layer Number					
Lab ID Number		3110423	3110424	3110425	3110426
Sample Location		1st Floor, Wall, 12" x 12" Acoustic Wall Tile to CMU	1st Floor, Wall, 12" x 12" Acoustic Wall Tile to CMU	Exterior, Windows, Frame to Brick, White	Exterior, Windows, Frame to Brick, White
Sample Description		Glue Dab	Glue Dab	Caulk	Caulk
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Brown	Brown	White	White
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	5.0	5.0	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	5.0	5.0	ND	ND
Other Materials Present	% Organic	43.9	46.9	21.6	21.8
	% Carbonates	6.3	2.9	50.4	47.6
	% Other Inorganic	44.8	45.2	28.0	30.6

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 09/04/2025
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-34	6929-35	6929-36	6929-37
Layer Number					
Lab ID Number		3110427	3110428	3110429	3110430
Sample Location		Exterior, Roof, Large Diameter Pipe Support Pad, Black	Exterior, Roof, Large Diameter Pipe Support Pad, Black	Exterior, Roof, Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge	Exterior, Roof, Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge
Sample Description		Tar	Tar	Caulk	Caulk
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	85.9	86.7	43.5	38.3
	% Carbonates	5.8	3.8	47.3	50.5
	% Other Inorganic	8.3	9.5	9.2	11.2

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 09/04/2025
Analyzed By : Fahrudin Lalic
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage  ,Lab Director

Sample ID Number		6929-38	6929-39	6929-42	6929-43
Layer Number					
Lab ID Number		3110431	3110432	3110435	3110436
Sample Location		Exterior, Roof, On Metal Vent, Faded Brown	Exterior, Roof, On Metal Vent, Faded Brown	Exterior, Roof, Large Diameter Pipe, Support Pad, Gray	Exterior, Roof, Large Diameter Pipe, Support Pad, Gray
Sample Description		Tar	Tar	Tar	Tar
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	87.6	87.7	60.1	61.0
	% Carbonates	3.9	3.7	31.3	31.8
	% Other Inorganic	8.5	8.6	8.6	7.2

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 09/04/2025
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-44	6929-45	6929-48	6929-49
Layer Number					
Lab ID Number		3110437	3110438	3110439	3110440
Sample Location		Exterior, Roof, Field, Bottom Layer (5th), On Concrete	Exterior, Roof, Field, Bottom Layer (5th), On Concrete	Exterior, Roof, Field, 3rd Layer, On Perlite	Exterior, Roof, Field, 3rd Layer, On Perlite
Sample Description		Tar	Tar	Built Up Roof	Built Up Roof
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	Yes	Yes
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	85.4	73.0	79.3	74.4
	% Carbonates	5.6	9.6	7.0	8.2
	% Other Inorganic	9.0	17.4	13.7	17.4

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 08/22/2025
Collected By : D. Stamper/J. Lopez
Date Received : 08/22/2025
Date Analyzed : 09/04/2025
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		6929-52	6929-53
Layer Number			
Lab ID Number		3110443	3110444
Sample Location		Exterior, Roof, Field, Top Layer, On ISO Foam	Exterior, Roof, Field, Top Layer, On ISO Foam
Sample Description		EPDM	EPDM
Analytical Method		NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes
	Homogenous	No	No
	Fibrous	Yes	Yes
	Color	Black	Black
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND	ND
Other Materials Present	% Organic	96.3	95.5
	% Carbonates	2.0	2.4
	% Other Inorganic	1.7	2.1

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Tighe & Bond
ADDRESS: 1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484
CONTACT: Lori Carriero

PROJECT # : 25-6929
SAMPLED BY: D. Stamper, J. Lopez
DATE SAMPLED: 22-Aug-25
STATE SAMPLED IN: New York
ANALYSIS METHOD: PLM, NOB-PLM, QTEM

PROJECT NAME: Pre-Construction Environmental Testing & Design Services
PROJECT BUILDING: Beacon Waste Water Treatment Plant - Blower Building
PROJECT ADDRESS: 96 Dennings Avenue
Beacon, NY 12508

TURN-AROUND TIME: 5-DAY

Sample	HM#	Floor	Space Name/ID #	Location	Material	Results
6929-01	1	1	Interior Windows	Sill & Surrounding Frame, On CMU	Skim Coat Plaster	3112088
6929-02	1	1	Interior Windows	Sill & Surrounding Frame, On CMU	Skim Coat Plaster	3112089
6929-03	1	1	Interior Windows	Sill & Surrounding Frame, On CMU	Skim Coat Plaster	3112090
6929-04	2	1	First Floor	Wall, On CMU	Mortar	3112091
6929-05	2	1	First Floor	Wall, On CMU	Mortar	3112092
6929-06	3	1	First Floor	Wall, Behind Acoustic Wall Tile	CMU	3112093
6929-07	3	1	First Floor	Wall, Behind Acoustic Wall Tile	CMU	3112094
6929-08	4	1	First Floor	Above Suspended Ceiling, Ceiling Deck	Concrete	3112095
6929-09	4	1	First Floor	Above Suspended Ceiling, Ceiling Deck	Concrete	3112096
6929-10	5	1	First Floor	Large Diameter Pipe on Suspended Tank, On Wire Lathe	Mudded Joint Packing	3112097
6929-11	5	1	First Floor	Large Diameter Pipe on Suspended Tank, On Wire Lathe	Mudded Joint Packing	3112098
6929-12	5	1	First Floor	Large Diameter Pipe on Suspended Tank, On Wire Lathe	Mudded Joint Packing	3112099
6929-13	6	Basement	Basement	On Metal Pipe Fitting	Mudded Joint Packing	3112100
6929-14	6	Basement	Basement	On Metal Pipe Fitting	Mudded Joint Packing	3112101
6929-15	6	Basement	Basement	On Metal Pipe Fitting	Mudded Joint Packing	3112102

AS LABELED ON PAPERWORK
INITIAL + DATE MP 08/28/2025

Comments:

SUBMITTED BY: [signature] DATE: 8.22.25

RECEIVED BY: [signature] AUG 22 '25 21:17 DATE:

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Tighe & Bond
ADDRESS: 1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484
CONTACT: Lori Carriero

PROJECT #: 25-6929
SAMPLED BY: D. Stamper, J. Lopez
DATE SAMPLED: 22-Aug-25
STATE SAMPLED IN: New York
ANALYSIS METHOD: PLM, NOB-PLM, QTEM

PROJECT NAME: Pre-Construction Environmental Testing & Design Services
PROJECT BUILDING: Beacon Waste Water Treatment Plant - Blower Building
PROJECT ADDRESS: 96 Dennings Avenue
Beacon, NY 12508

TURN-AROUND TIME: 5-DAY

Sample	HM#	Floor	Space Name/ID #	Location	Material	Results
6929-16	7	1	First Floor	Suspended Tank, Body	Packing	3112103
6929-17	7	1	First Floor	Suspended Tank, Body	Packing	3112104
6929-18	7	1	First Floor	Suspended Tank, Body	Packing	3112105
6929-19	8	1	First Floor	Ceiling, Splined, Back of Acoustic Ceiling Tile	Insulated Backing	3112106
6929-20	8	1	First Floor	Wall, On Acoustic Wall Tile	Insulated Backing	3112107
6929-21	9	1	First Floor	Above Suspended Ceiling, On Metal Pipe	Pipe Insulation	3112108
6929-22	9	Basement	Basement	On Metal Pipe	Pipe Insulation	3112109
6929-23	9	Basement	Basement	On Metal Pipe	Pipe Insulation	3112110
6929-24	10	1	First Floor	Floor	Slab	3112111
6929-25	10	1	First Floor	Floor	Slab	3112112
6929-26	11	Exterior	Exterior	Foundation to Façade Wall	Concrete	3112113
6929-27	11	Exterior	Exterior	Foundation to Façade Wall	Concrete	3112114
6929-28	12	Exterior	Exterior	Façade	Brick + Mortar	3112115
6929-29	12	Exterior	Exterior	Façade	Brick + Mortar	3112116
6929-30	13	1	First Floor	Wall, 12"x12" Acoustic Wall Tile to CMU	Glue Dab	

Comments:

SUBMITTED BY: [signature] DATE: 8-22-25

RECEIVED BY: MD WARNER AUG 22 '25 21:17 DATE:

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Tighe & Bond
ADDRESS: 1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484
CONTACT: Lori Carriero

PROJECT # : 25-6929
SAMPLED BY: D. Stamper, J. Lopez
DATE SAMPLED: 22-Aug-25
STATE SAMPLED IN: New York
ANALYSIS METHOD: PLM, NOB-PLM, QTEM
TURN-AROUND TIME: 5-DAY

PROJECT NAME: Pre-Construction Environmental Testing & Design Services
PROJECT BUILDING: Beacon Waste Water Treatment Plant - Blower Building
PROJECT ADDRESS: 96 Dennings Avenue
Beacon, NY 12508

Sample	HM#	Floor	Space Name/ID #	Location	Material	Results
6929-31	13	1	First Floor	Wall, 12"x12" Acoustic Wall Tile to CMU	Glue Dab	
6929-32	14	Exterior	Exterior	Windows, Frame to Brick, White	Caulk	
6929-33	14	Exterior	Exterior	Windows, Frame to Brick, White	Caulk	
6929-34	15	Exterior	Roof	Large Diameter Pipe Support Pad, Black	Tar	
6929-35	15	Exterior	Roof	Large Diameter Pipe Support Pad, Black	Tar	
6929-36	16	Exterior	Roof	Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge	Caulk	
6929-37	16	Exterior	Roof	Large Diameter Pipe Elbow, Roof Penetration Pad, Top Layer to Edge	Caulk	
6929-38	17	Exterior	Roof	On Metal Vent, Faded Brown	Tar	
6929-39	17	Exterior	Roof	On Metal Vent, Faded Brown	Tar	
6929-40	18	Exterior	Roof	Large Diameter Elbow to Roof Penetration Curb	Sealant	
6929-41	18	Exterior	Roof	Large Diameter Elbow to Roof Penetration Curb	Sealant	
6929-42	19	Exterior	Roof	Large Diameter Pipe, Support Pad, Grey	Tar	
6929-43	19	Exterior	Roof	Large Diameter Pipe, Support Pad, Grey	Tar	
6929-44	20	Exterior	Roof	Field, Bottom Layer (5th), On Concrete	Tar	
6929-45	20	Exterior	Roof	Field, Bottom Layer (5th), On Concrete	Tar	

Comments:

SUBMITTED BY: [signature] DATE: 8.22.25

RECEIVED BY: MDWARNER AUG 22 '25 DATE: 21:17

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Tighe & Bond
ADDRESS: 1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484
CONTACT: Lori Carriero

PROJECT # : 25-6929
SAMPLED BY: D. Stamper, J. Lopez
DATE SAMPLED: 22-Aug-25
STATE SAMPLED IN: New York
ANALYSIS METHOD: PLM, NOB-PLM, QTEM

PROJECT NAME: Pre-Construction Environmental Testing & Design Services
PROJECT BUILDING: Beacon Waste Water Treatment Plant - Blower Building
PROJECT ADDRESS: 96 Dennings Avenue
Beacon, NY 12508

TURN-AROUND TIME: 5-DAY

Sample	HM#	Floor	Space Name/ID #	Location	Material	Results
6929-46	21	Exterior	Roof	Field, 4th Layer, On Tar	Perlite	3112117
6929-47	21	Exterior	Roof	Field, 4th Layer, On Tar	Perlite	3112118
6929-48	22	Exterior	Roof	Field, 3rd Layer, On Perlite	Built Up Roof	
6929-49	22	Exterior	Roof	Field, 3rd Layer, On Perlite	Built Up Roof	
6929-50	23	Exterior	Roof	Field, 2nd Layer, On Built Up Roof	ISO Foam	
6929-51	23	Exterior	Roof	Field, 2nd Layer, On Built Up Roof	ISO Foam	
6929-52	24	Exterior	Roof	Field, Top Layer, On ISO Foam	EPDM	
6929-53	24	Exterior	Roof	Field, Top Layer, On ISO Foam	EPDM	

Comments:

SUBMITTED BY: [signature] DATE: 8.22.25

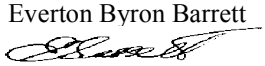
RECEIVED BY: [signature] AUG 22 '25 21:17 DATE:

Appendix C:
XRF ANALYTICAL DATA

Eastern Analytical Services, Inc.

Bulk Sample Report

RE: CPN 256929 - Tighe & Bond - Pre-Con Env Testing and Design - Beacon Waste Water Treatment Plant - Blower Bldg - 96 Dennings Ave - Beacon, NY

Date Collected: 08/22/2025
Collected By: D. Stamper/J. Lopez
Date Received: 08/22/2025
Date Analyzed: 08/28/2025
Analyzed By: Everton Byron Barrett
Signature: 
Analyte: Pb Paint
Analytical Method: EPA 3050B/7000B
NYS Lab Number: 10851
Paul Stascavage  ,Lab Director

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID# / Lab ID#	Sample Location	Sample Notes	Concentration
6929-TL-01 3110494	1st Floor, Pump, Blue	Paint Chip	234.4 mg/kg 0.02 %
6929-TL-02 3110495	Basement, Wall, On Concrete, Gray	Paint Chip	32.4 mg/kg 0.01 %
6929-TL-03 3110496	1st Floor, Floor, On Concrete, Gray	Paint Chip	BRL < 34.3 mg/kg BRL < 0.01 %
6929-TL-04 3110497	1st Floor, Metal Pipe, Green	Paint Chip	34880.3 mg/kg 3.49 %
6929-TL-05 3110498	Exterior, Old Air Filter System, Green	Paint Chip	1699.5 mg/kg 0.17 %

BRL = Below Reporting Limit
Reporting Limit = 0.12 ppm

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Tighe & Bond
ADDRESS: 1000 Bridgeport Avenue, 3rd Floor
Shelton, CT 06484
CONTACT: Lori Carriero

PROJECT # : 25-6929
SAMPLED BY: D. Stamper, J. Lopez
DATE SAMPLED: 22-Aug-25
STATE SAMPLED IN: New York
ANALYSIS METHOD: Total Lead

PROJECT NAME: Pre-Construction Environmental Testing & Design Services
PROJECT BUILDING: Beacon Waste Water Treatment Plant - Blower Building
PROJECT ADDRESS: 96 Dennings Avenue
Beacon, NY 12508

TURN-AROUND TIME: 5-DAY

Sample	HM#	Floor	Space Name/ID #	Location	Material	Results
6929-TL-01	1	1	First Floor	Pump, Blue	Paint Chip	3110494
6929-TL-02	2	Basement	Basement	Wall, On Concrete, Grey	Paint Chip	3110495
6929-TL-03	3	1	First Floor	Floor, On Concrete, Grey	Paint Chip	3110496
6929-TL-04	4	1	First Floor	Metal Pipe, Green	Paint Chip	3110497
6929-TL-05	5	EXT	Exterior	Old Air Filter System, Green	Paint Chip	3110498

AS LABELED ON PAPERWORK
MP 08/25/2025

Comments:

SUBMITTED BY:

DATE: 8-22-25

RECEIVED BY:

AUG 22 '25 21:17
DATE:

PAGE 1 OF 1

Appendix D:
PERSONNEL LICENSES & CERTIFICATIONS

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9, Wappinger Falls, NY, 12590

License Number: 29085
License Class: RESTRICTED
Date of Issue: 01/02/2025
Expiration Date: 01/31/2026
Duly Authorized Representative: Lawrence J Holzapfel

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

United States Environmental Protection Agency

This is to certify that

Quality Environmental Solutions & Technologies, Inc.

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint renovation, repair, and painting activities pursuant to 40 CFR Part 745.89

In the Jurisdiction of:

All EPA Administered States, Tribes, and Territories

This certification is valid from the date of issuance and expires December 01, 2026

NAT-119213-3

Certification #

November 09, 2021

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

United States Environmental Protection Agency

This is to certify that

Quality Environmental Solutions & Technologies, Inc.

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint renovation, repair, and painting activities pursuant to 40 CFR Part 745.89

In the Jurisdiction of:

All EPA Administered States, Tribes, and Territories

This certification is valid from the date of issuance and expires December 01, 2031

NAT-119213-4

Certification #

November 14, 2024

Issued On

Marc Edmonds, Chief

Risk Assessment Management Branch 2.

NEW YORK STATE

MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISE ("MWBE")

CERTIFICATION

Empire State Development's Division of Minority and Women's Business Development grants a

Minority Business Enterprise (MBE)

pursuant to New York State Executive Law, Article 15-A to:

Quality Environmental Solutions & Technologies Inc. DBA QuEST

Certification Awarded on: May 13, 2024
Expiration Date: May 13, 2029
File ID#: 49952

NEW YORK STATE OF OPPORTUNITY. Division of Minority and Women's Business Development

A Division of Empire State Development

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2026
Issued April 01, 2025

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL STASCAVAGE
EAS INC - EASTERN ANALYTICAL SERVICES INC
4 WESTCHESTER PLAZA
ELMSFORD, NY 105231610

NY Lab Id No: 10851

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

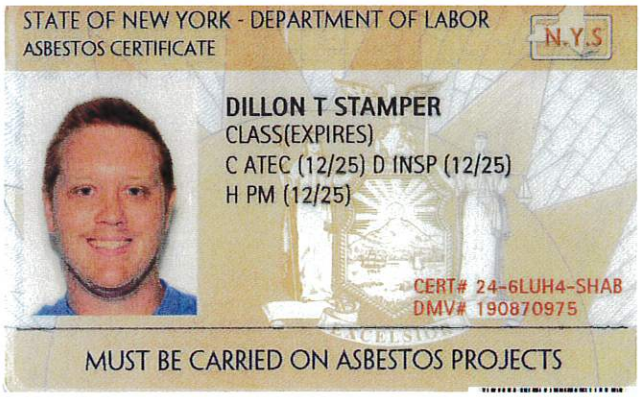
Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Mate	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

	EPA 3050B

Serial No.: 70280



IF FOUND, RETURN TO:

NYSDOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12226

01213 007424597 85

OSHA
Occupational Safety and Health Administration

20-006275725

This card acknowledges that the recipient has successfully completed:

10-hour Construction Safety and Health

This card issued to:

Dillon Stamper

Robert Serino	6/28/2022
Trainer Name	Date Issued

OSHA Training Institute Education Centers®
University of South Florida

813-974-2284
usfotiec-cards@usf.edu

OSHA recommends Outreach Training Courses as an orientation to occupati >nal safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to 5 years, or both.

To verify this training scan the QR code with your mobile device.

Rev. 1/2016

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S

JESSICA E LOPEZ
CLASS(EXPIRES)
D INSP (06/25) C ATEC (06/25)
H PM (06/25)

CERT# 24-6AJ9Y-SHA8
DMV# 262028351

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 007304383 87

IF FOUND, RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12226

OSHA
Occupational Safety and Health Administration

20-006275724

This card acknowledges that the recipient has successfully completed:

10-hour Construction Safety and Health

This card issued to:

Jessica Lopez

Robert Serino	6/28/2022
Trainer Name	Date Issued

OSHA Training Institute Education Centers®
University of South Florida

813-974-2284
usfotiec-cards@usf.edu

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

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Rev. 1/2016