

**MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION**

March 18, 2020

PERMIT TO INSTALL
186-19

ISSUED TO
Founders Brewing Company

LOCATED AT
235 Grandville Avenue, S. W.
Grand Rapids, Michigan 49503

IN THE COUNTY OF
Kent

STATE REGISTRATION NUMBER
P0648

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: January 22, 2020	
DATE PERMIT TO INSTALL APPROVED: March 18, 2020	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO ₂ e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H ₂ S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO _x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO ₂	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.
9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
 - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
 - b) A visible emission limit specified by an applicable federal new source performance standard.
 - c) A visible emission limit specified as a condition of this Permit to Install.
12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**
13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EU-Brewing	<p>Three brewhouses that brew primarily through mechanical conversion. Each brewhouse contains a dry mill, mash/lauter tun for mashing in, brew kettle, and whirlpool. Wort is sent through a heat exchanger to further cool before going to the fermentation tanks.</p> <p>Heat exchangers capture and condense steam for energy recovery through temperature condensation.</p>	<p>Classic brewhouse: 11/2007</p> <p>Combicube brewhouse: 8/2011</p> <p>300 bbl brewhouse: 12/2014</p>	FGBREWERY
EU-Fermentation	<p>Tanks for fermentation and conditioning are located in cellars. There are five cellars.</p> <p>The tanks vary in size from 500 US barrels (bbls) to 1,500 US bbls. There are three types of tanks: yeast brinks, primary fermenters, and secondary fermenters. The yeast brinks store the yeast that is prepped for fermentation, the yeast is the most active in the primary fermenters, and the secondary fermenters are for conditioning the beer as the fermentation slows.</p>	<p>Cellar 1: 11/2007 Cellar 2: 9/2009 Cellar 3: 2/2013 Cellar 4: 12/2014 Cellar 5: 4/2016</p>	FGBREWERY
EU-PKG	<p>Finished beer is dispensed into containers: bottles, cans, and kegs. These activities exhaust into the in-plant environment.</p>	<p>Line 1: 2/2010 Line 2: 6/2015 Line 3: 2/2016 Line 4: 2/2018</p>	FGBREWERY

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

FLEXIBLE GROUP SPECIAL CONDITIONS

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGBREWERY	Processes related directly to beer production, including brewing, fermenting and conditioning, and container filling.	EU-Brewing, EU-Fermentation, EU-PKG

**FGBREWERY
 FLEXIBLE GROUP CONDITIONS**

DESCRIPTION

Processes related directly to beer production, including brewing, fermenting and conditioning, and container filling.

Emission Unit: EU-Brewing, EU-Fermentation, EU-PKG

POLLUTION CONTROL EQUIPMENT

NA

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. VOC	24.84 tpy	12-month rolling time period as determined at the end of each calendar month.	FGBREWERY	SC VI.1, SC VI.3	R 336.1702(a)

II. MATERIAL LIMIT(S)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Beer Brewed	1,145,760 bbl ^a /yr	12-month rolling time period as determined at the end of each calendar month.	FGBREWERY	SC VI.1, SC VI.2	R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a)

bbl = barrels
^a 1 bbl beer = 31 gallons

III. PROCESS/OPERATIONAL RESTRICTION(S)

NA

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. (R 336.1201(3))

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. (R 336.1201(3))

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. (R 336.1205(1)(a) & (3), R 336.1225, R 336.1702a)

2. The permittee shall monitor and record, in a satisfactory manner, the amount of beer brewed, fermented, and packaged in FGBREWERY on a monthly and 12-month rolling time period basis. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702a)**
3. The permittee shall calculate and keep, in a satisfactory manner, records of monthly and 12-month rolling total VOC mass emissions for FGBREWERY. The permittee shall keep all records on file and make them available to the Department upon request. The calculations shall be performed according to Appendix A or an alternate method approved by the District Supervisor. **(R 336.1702(a))**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-BrewingMR1	24 x 16	60	40 CFR 52.21(c) & (d)
2. SV-BrewingMR2	12	30	40 CFR 52.21(c) & (d)
3. SV-FermentationC4 ^b	24 x 24	13	40 CFR 52.21(c) & (d)
4. SV-FermentationC3	12	63	40 CFR 52.21(c) & (d)
5. SV-FermentationC5 ^b	24 x 12	13	40 CFR 52.21(c) & (d)

^bThis stack has a horizontal discharge.

IX. OTHER REQUIREMENT(S)

NA

Footnotes:

¹ This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX A VOC Calculation Method

12-month rolling tpy calculations shall be performed in the following manner:

Emissions in tons/month are determined first:

$$Emissions = \frac{Emission\ Factor * Throughput}{Conversion\ Factor}$$

FGBREWERY monthly emissions

= Emissions of Brewing + Emissions of Fermentation + Emissions of Filling (of all types)

Every month, the 12-month rolling tpy emissions will be calculated by adding the latest month's emissions to the sum of the previous 11 months of emissions for a total of 12 months of emissions.

Emission Factors will be the emission factors used in the evaluation of this permit, unless there is an approved site-specific emission factor, based on an AQD approved stack test. The tested emission factor shall be used thereafter unless otherwise required by the AQD District Supervisor. The emission factors used in the evaluation of this permit are listed below:

Process Type	Emission Factor (lb/1,000 bbl)
Brewing	0.7965
Fermentation	2.57
Bottle Filling	40
Can Filling	35
Keg Filling	0.69

The total volume of liquid will move through all of the steps of the Brewing Process (mashing in/lautering, brewing, settling, and cooling), so the emission factors were summed to reach an overall Brewing emission factor. The total volume of liquid will move through all of the steps of the Fermentation Process (fermentation and conditioning), so the emission factors were summed to reach an overall Fermentation emission factor. The three types of filling cannot all be performed for the same volume of liquid; therefore, their emission factors were kept separate and emissions must be separately calculated for each type.

The *Throughput* will be in bbl/month. If measured in gallons/month, then the conversion of 31 gallons/bbl will be used to convert the throughput for the equation.

Since the Emission Factors are in lbs, the *Conversion Factor* is 2,000 lb/ton.