

United States Environmental Protection Agency, Region 9

Air Division

Technical Support Document

for

EPA's Notice of Rulemaking

for the

California State Implementation Plan

Mojave Desert Air Quality Management District's

Rule 1165, Glass Melting Furnaces

Prepared by: Idalia Perez

January 2012

Mojave Desert Air Quality Management District (MDAQMD)

Submitted Rule

MDAQMD Rule 1165, Glass Melting Furnaces:

- § Adopted: August 12, 2008
- § Submitted: December 23, 2008
- § Determined complete: April 20, 2009

Previous Rule Submittals

A previous version of Rule 1165 was adopted on August 27, 2007 and submitted to EPA on March 7, 2008. This interim submittal was superseded by the December 23, 2008 submittal which is discussed in this Technical Support Document (TSD). Although we can only act on the most recent version of the submitted rule, we have reviewed previously submitted versions.

SIP-Approved Rule

There is currently no SIP-approved version of Rule 1165.

Rule Summary

Rule 1165 limits emission of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs) and sulfur oxides (SO_x) from glass melting furnaces that produce at least 5 tons of glass per day.

Emission limits are as follows (Section (C)(1)).

Type of Furnace	Combustion Type	NO _x	CO	VOC
Container Glass or Fiberglass	100% Air-Fuel Fired	4.0 lb/ton of glass pulled on a 24-hour block average	300 ppmv	20 ppmv
	Oxygen Assisted Combustion	4.0 lb/ton of glass pulled on a 24-hour block average	1.0 lb/ton of glass pulled	0.25 lb/ton of glass pulled
Flat Glass	100% Air-Fuel Fired	9.2 lb/ton of glass pulled on a 24-hour block average and 7.0 lb/ton of glass pulled on a rolling 30-day average	300 ppmv	20 ppmv
	Oxygen Assisted Combustion	9.2 lb/ton of glass pulled on a 24-hour block average and 7.0 lb/ton of glass pulled on a rolling 30-day average	0.9 lb/ton of glass pulled	0.1 lb/ton of glass pulled

SO_x is controlled by requiring units to fire on PUC-quality natural gas. Liquid fuels are allowed as backup fuels if they contain no more than 15 ppm of sulfur and the unit firing them has a SO_x emission control system with a control efficiency of 50% or greater.

Section (C)(3) indicates the startup requirements, section (C)(4) has the shutdown requirement and Section (C)(5) has the idling requirements.

Section (D) has monitoring and recordkeeping requirements.

Section (E) has compliance procedures and tests methods.

Section (F) indicates what constitutes a violation of the rule.

Effects on Emissions

Supporting information that was included in the SIP-submittal indicates that no emission reduction will result from implementation of Rule 1165 because the District's only facility subject to this Rule has permit conditions more stringent than the Rule. In addition, this facility ceased operations in 2008.

Rule Evaluation Criteria

We have primarily used the following three criteria to evaluate Rule 1159:

Rule Stringency Section 172(c)(1) of the Clean Air Act (CAA) requires nonattainment areas to implement all reasonably available control measures (RACM), including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT), as expeditiously as practicable. Ozone nonattainment areas classified as moderate or above must require RACT for all major sources of NO_x. CAA § 182(b)(2) & (f). In addition, SIP rules must implement Reasonably Available Control Measures (RACM), including Reasonably Available Control Technology (RACT), in moderate PM-10 nonattainment areas (see CAA sections 189(a)(1)) The MDAQMD regulates an ozone nonattainment area classified as Severe-17 for the 1-hour ozone standard and classified as moderate for the 8-hour ozone standard (see 40 CFR part 81), thus Rule 1159 must fulfill RACT requirements for NO_x. The MDAQMD also regulates a moderate PM-10 nonattainment area, and is therefore subject to the requirement under sections 189(a)(1)(C) and 189(e) of the Act to implement RACM for control of PM-10 and PM-10 precursor emissions.

Enforceability CAA section 110(a)(2)(A) requires that regulations submitted to EPA for approval into a State Implementation Plan (SIP) must be clear and legally enforceable.

SIP Revisions CAA section 110(l) prohibits EPA from approving any SIP revision that would interfere with any applicable requirement concerning attainment and reasonable further progress (RFP) or any other applicable requirement of the CAA. In addition, CAA section 193 prohibits the modification of any SIP-approved control requirement in effect before November 15, 1990, in a nonattainment area.

Guidance and policy documents that we used to define specific enforceability, RACT and RACM requirements include the following:

- *Issues Relating to VOC Regulation, Cutpoints, Deficiencies, and Deviations* (the “Blue Book”), US EPA, OAQPS (May 25, 1988).
- *Guidance Document for Correcting Common VOC and Other Rule Deficiencies*, EPA Region IX (August 21, 2001, the “Little Bluebook”).
- *State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, 57 FR 13498 (April 16, 1992); 57 FR 18070 (April 28, 1992).
- *State Implementation Plans for Serious PM-10 Nonattainment Areas, and Attainment Date Waivers for PM-10 Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, 59 FR 41998 (August 16, 1994).
- *PM-10 Guideline Document*, US EPA 452/R-93-008 (April 1993).
- *Interim White Paper - Midwest RPO Candidate Control Measure: Glass Manufacturing*, Lake Michigan Air Directors Consortium (December 12, 2005) http://www.ladco.org/reports/control/white_papers/glass_fiberglass_manufacturing_plants.pdf
- *Alternative Control Techniques Document-- NOx Emissions from Glass Manufacturing*, US EPA 453/R-94-037 (June 1994). <http://www.epa.gov/ttn/catc/dir1/glassact.pdf>
- *Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques in the Glass Manufacturing Industry*, European Commission (December 2001). <http://www.epa.ie/downloads/advice/brefs/glass.pdf>

Evaluation of Rule Stringency

Due to the high temperatures in glass furnaces (up to 1650°C – 2000°C in the flame), the dominant source of NOx is thermally generated NOx. According to the ACT, uncontrolled NOx emissions from glass manufacturing facilities are typically (see Table 2-1 in the ACT):

Type of glass produced	Uncontrolled NOx Emissions (lb/T)
Container	1.8 – 21.6
Flat	8.8 – 23.6

The wide range in emissions reflects the effects of furnace type, age and combustion characteristics on NOx emissions. Various technologies, including combustion modifications, process modifications and post-combustion modifications, are available to control NOx emissions from glass manufacturing facilities with control efficiencies ranging between 10 and 85% (see Table 2-2, ACT). The effects of these techniques are not additive; therefore, a 10% reduction due to one technique cannot simply be added to 10% from a different technique. Control efficiencies generally decrease with furnace age. The most effective technique discussed in the ACT is oxy-firing, in which combustion is done in an oxygen rich environment and requires a source of O₂. Many of the techniques can only be effectively installed during a furnace rebuild and some of them have not been

shown to be applicable to the manufacturing of all types of glass. Some considerations that may hinder the installment of control techniques include space requirements and concerns of glass quality due to redox changes. Additionally, some of these control techniques can increase emissions of other pollutants (e.g. increased SO₂ emissions from some combustion modifications techniques due to an atmosphere with a larger reducing capacity). The percentages in reduction in Table 2-2 of the ACT assume uncontrolled NO_x emissions of 15.8 lb/T for flat glass. Using these emission values and Table 2-2 of the ACT, we can calculate a best case scenario for controlled NO_x emissions from flat glass furnaces to be 2.37 lb/T. This calculated best case scenario value does not represent an emission that has been achieved in practice. We are only focusing on flat glass because the only existing source at MDAQMD subject to this rule produces flat glass, AGC Flat Glass North America located in Victorville.

The following are NO_x emissions limits in permits obtained from the RBLC:

RBLC ID	Year Permit Issued	Type	NO _x (lb/T)
OH-0319	2008	Flat	7.4
WA-0320	2008	Flat	7.0

The following table contains NO_x emission limits for different types of glass manufacturing facilities in prohibitory rules throughout the US:

Area	Type of Glass	NO _x Emission Limit (lb/T)
BAAQMD (Rule 9-12, 1994)	All	5.5 (3 hour period)
SJVUAPCD (Rule 4354, Tier 2, compliance date of 3/31/08)	Flat	9.2 (24-hour block average) & 7.0 (30-day rolling average)
SJVUAPCD (Rule 4354, compliance date of 1/1/11)	Flat	5.5 (24-hour block average) & 5.0 (30-day rolling average)
SJVUAPCD (Rule 4354, compliance date of 1/1/14)	Flat	3.7 (24-hour block average) & 3.2 (30-day rolling average)
SJVUAPCD (Rule 4354, compliance date of 1/1/16)	Flat	3.4 (24-hour block average) & 2.9 (30-day rolling average)
SCAQMD (Rule 1117, 1984)	All	4.0
New Jersey State Dept of Environmental Protection (7:27-19, 2008)	Various	4.0
New Jersey State Dept of Environmental Protection (7:27-19, 2008)	Flat, PTE > 10 T/year	9.2
Massachusetts Department of Environmental Protection (310 CMR 7.19(11))	All Types, max production rate \geq 14 T/day	5.3
New York Department of Environmental Conservation (6 NYCRR Part 220-2)	Flat	9.2 (24-hour block average), or 7.0 (30-day rolling average)

Rule 1165 implements RACT for NO_x in Mojave Desert AQMD at the time of rule submittal to EPA for reasons including:

- South Coast AQMD Rule 1117 and Bay Area AQMD Rule 9-12 have more stringent limits for flat glass manufacturing facilities but there are no facilities of this type in the South Coast or Bay Area District thus the limits have not been shown to be reasonable available in practice.
- At the time of rule adoption, MDAQMD's Rule 1165 was as stringent San Joaquin Valley Unified APCD's Rule 4354 which was approved into the SIP in 2007 (72 FR 41894). SJVUAPCD has subsequently amended the rule and added more stringent NO_x emission limits with compliance deadlines ranging from January 2011 to January 2016.
- The 1994 ACT document mentioned above provide technical information including control techniques and achievable controlled NO_x emission levels from glass melting furnaces. Rule 1165 requirements are consistent with data in the ACT.
- The combination of daily and monthly limits complement each other by minimizing large spikes in emissions due to short-term variations as well as ensuring lower emissions are achieved over longer timeframes. Taken together, these limits are consistent with available the technology as well as the operational and emission characteristics of glass manufacturing facilities which have short-term fluctuations due to minor process adjustments as well as longer term fluctuations due to changes in production output driven by varying market conditions.

Since no CTG has been issued for this activity, we do not have clear national guidance defining presumptive RACT. However, we believe the analysis summarized above sufficiently demonstrates that Rule 1165 implements RACT at the time of rule adoption for NO_x emitted from glass furnaces in Mojave Desert.

CAA §172(c)(1) requires nonattainment areas to implement all reasonably available control measures, including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of RACT, as expeditiously as practicable. Glass furnaces can emit direct PM, as well as SO_x, which is a precursor to PM, and NO_x, which is a precursor to both PM and ozone. Therefore, MDAQMD must implement RACM for glass furnaces if those measures will advance attainment of the National Ambient Air Quality Standard (NAAQS) for PM₁₀ or ozone, when considered collectively with other reasonable measures. Additional control measures may be required pursuant to CAA §172(c)(1) if both: (1) additional measures are reasonably available; and (2) these additional reasonably available measures will advance attainment in the area when considered collectively. In separate rulemakings, EPA will take action on the State's RACM demonstration for ozone based on an evaluation of the control measures submitted as a whole and their overall potential to advance the applicable attainment dates in the District. *See* 40 CFR §§ 51.1010, 51.912(d).

Evaluation of Enforceability and SIP Revision Criteria

Recordkeeping and other compliance provisions in the rule ensure that the requirements are adequately enforceable.

The submitted rule is a new addition to the SIP, strengthening the requirements of the SIP. Therefore, we propose to determine that an approval of the submittal would comply with CAA sections 110(1) and 193 because (1) the proposed SIP revision would not interfere with the on-going process for ensuring that requirements for RFP and attainment of the NAAQS are met, and (2) the submitted SIP revision is more stringent than the existing SIP requirements.

Suggested Rule Improvements

Although not currently basis for rule disapproval, EPA recommends that the MDAQMD make the following improvements in the next revision of Rule 1165:

1. An equation on how to calculate control efficiency, which is referred to in Section (C)(2)(B), should be added to the Rule.
2. A definition of the terms “innovative” and “common use”, used in Section (C)(3)(d)(i) should be added to the Rule.
3. Section (C)(7) should also require a CO CEMS.
4. The District should consider adopting the NO_x, SO_x and PM emission limits in San Joaquin Valley Rule 4354, amended on May 19, 2011.
5. The District should evaluate if long-term averaging (longer than 24 hours) is still needed given changes in available technology and is consistent with attaining and maintaining the NAAQS as well as with meeting RFP/ROP.

Recommendation

EPA staff recommends approval of submitted Rule 1165 for incorporation into the California Applicable SIP.

Other References

1. Submitted Rule 1165
2. Staff Report
3. RBLC permit information (OH-0319, WA-0320)



http://cfpub.epa.gov/tbl/index.cfm?action=PermitDetailFacilityInfo&facility_id=26889

Last updated on Tuesday, April 19, 2011

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Date Entered: 12/04/2008

Date Last Modified: 01/05/2009
FINAL

RBLC ID: OH-0319
Corporate/Company: PILKINGTON NORTH AMERICA, INC.
Facility Name: PILKINGTON NORTH AMERICA, INC.
Facility Description: FLAT GLASS MANUFACTURING

State: OH
County: WOOD
EPA Region: 5
Zip Code: 434601215
Country: USA

Facility Contact Information:

Name: CHARLES BAUMGARTNER
Phone:
E-Mail:

Agency Contact Information:

Agency: OH001 - OHIO ENVIRONMENTAL PROTECTION AGENCY
Contact: MS. CHERYL SUTTMAN
Address: OH ENV. PROTECTION AGENCY
DIV OF AIR POLLUTION CONTROL
LAZARUS GOVERNMENT CENTER
P. O. BOX 1049
COLUMBUS, OH 43215-1049
Phone: (614)644-3617
Other Agency Contact Info:
Application Accepted Date: ACT 12/19/2007
Permit Issuance Date: ACT 10/27/2008
Permit Type: C: Modify process at existing facility.
FRS Number: UNKNOWN
SIC Code: 3211
NAICS Code: 327211
EST/ACT DATE
PERMIT URL:

Affected Class I / U.S. Border Area:

No affected Class I areas identified.

Facility-Wide Emission Increase/Decrease: (After prevention/control measures)

No facilitywide emissions data available for this facility.

Other Permitting Information:

FLOAT GLASS MELTING FURNACE, MODIFICATION TO ADD 2 AIR TOXICS (OHIO MODELING COMPLIANCE POLICY) AND REVISE MONITORING, RECORDKEEPING, REPORTING, AND TESTING TERMS. CID PSD FACILITY WAS NEVER PREVIOUSLY ENTERED.



<http://cfpub.epa.gov/ra/ra/index.cfm?processid=630&facilityid=25859&processid=106505>
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Final

FINAL

RBL ID: OH-0319
Corporate/Company: PILKINGTON NORTH AMERICA, INC.
Facility Name: PILKINGTON NORTH AMERICA, INC.
Process: FLOAT GLASS MELTING FURNACE

Pollutant Information - List of Pollutants

Final

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide (CO)	200,000 LB/H	BACT-PSD	UNKNOWN
Nitrogen Oxides (NOx)	220,000 LB/H	Other Case-by-Case	UNKNOWN
Particulate Matter (PM)	41,000 LB/H	Other Case-by-Case	UNKNOWN
Sulfur Dioxide (SO ₂)	100,000 LB/H	Other Case-by-Case	UNKNOWN
Visible Emissions (VE)	36,7000 %	Other Case-by-Case	UNKNOWN
Volatile Organic Compounds (VOC)	4,5000 LB/H	Other Case-by-Case	UNKNOWN

Process Notes: 229,535 TONS OF GLASS DRAW PER YEAR



<http://cfpub.epa.gov/ra/ra/index.cfm?processid=630&facilityid=25859&processid=106505>
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Pollutant Information

Final

FINAL

RBL ID: OH-0319
Corporate/Company: PILKINGTON NORTH AMERICA, INC.
Facility Name: PILKINGTON NORTH AMERICA, INC.
Process: FLOAT GLASS MELTING FURNACE

Pollutant: Carbon Monoxide **CAS Number:** 630-08-0
Pollutant Group: Inorganic Compounds, **Substance Registry System:** Carbon Monoxide
(s):
PZ/Add-on Description: Pollution Prevention/Add-on Control Equipment/No Controls Feasible: N

Test Method: Unspecified

Percent Efficiency: 0
Compliance Verified: Unknown
EMISSION LIMITS: BACT=PSD
Case-by-Case Basis: SIP
Other Applicable Requirements: Unknown
Other Factors Influence Decision: Unknown
Emission Limit 1: 200,000 LB/H
Emission Limit 2: 438,000 T/YR AS A ROLLING 365-DAY SUMMATION
Standard Emission Limit: 0
COST DATA:
Cost Verified? No
Dollar Year Used in Cost Estimates: 0 \$/ton
Cost Effectiveness: 0 \$/ton
Incremental Cost Effectiveness: 0 \$/ton
Pollutant Notes: CONTINUOUS CO EMISSIONS MONITOR

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RBL ID: OH-0319
Corporate/Company: PILKINGTON NORTH AMERICA, INC.
Facility Name: PILKINGTON NORTH AMERICA, INC.
Process: FLOAT GLASS MELTING FURNACE

Pollutant: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5
Pollutant Group: Inorganic compounds, oxides of Sulfur (SOx)
Substance Registry System: SULFUR DIOXIDE (SO2)
P2/Ad-on Description: Pollution Prevention/Ad-on Control Equipment/Both/No Controls Feasible: N

Test Method: Unspecified

Percent Efficiency: 0
Compliance Verified: Unknown
EMISSION LIMITS: Other Case-by-Case
Case-by-Case Basis: SIP
Other Applicable Requirements: Unknown
Other Factors Influence Decision: 272.0000 T/YR AS A ROLLING 365-DAY SUMMATION
Emission Limit 1: 2.3700 LB/T OF GLASS DEW
Emission Limit 2: No
Standard Emission Limit: No
COST DATA: No
Cost Verified: No
Dollar Year Used in Cost Estimates: 0 \$/Ton
Incremental Cost Effectiveness: 0 \$/Ton
Pollutant Notes: SYNTHETIC MINOR LIMIT ON SO2 TO AVOID PSD; BASED ON A ROLLING 365-DAY SUMMATION OF THE DAILY PRODUCTION RATE, NOT TO EXCEED 229,535 TONS.

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RBL ID: OH-0319
Corporate/Company: PILKINGTON NORTH AMERICA, INC.
Facility Name: PILKINGTON NORTH AMERICA, INC.
Process: FLOAT GLASS MELTING FURNACE

Pollutant: Visible Emissions (VE) **CAS Number:** VE
Pollutant Group: (s)
Substance Registry System: Visible Emissions (VE)
P2/Ad-on Description: Pollution Prevention/Ad-on Control Equipment/Both/No Controls Feasible: N

Test Method: Unspecified

Percent Efficiency: 0
Compliance Verified: Unknown
EMISSION LIMITS: Other Case-by-Case
Case-by-Case Basis: SIP
Other Applicable Requirements: Unknown
Other Factors Influence Decision: 36.7000 % OFACITY, AS A 6-MIN. AVG. (LEVEL)
Emission Limit 1: 0
Emission Limit 2: No
Standard Emission Limit: No
COST DATA: No
Cost Verified: No
Dollar Year Used in Cost Estimates: 0 \$/Ton
Incremental Cost Effectiveness: 0 \$/Ton
Pollutant Notes: EQUIVALENT VISIBLE EMISSIONS LIMITATION ESTABLISHED DURING THE MOST RECENT STACK TEST. THE OPAQITY FROM THIS PROCESS SHALL NOT EXCEED 0.05 CONCENTRATIONS PER HOUR FOR NOT MORE THAN 6 CONSECUTIVE MINUTES IN ANY 60 MINUTES A DENSITY NOT GREATER THAN 0.05 AS A 6-MINUTE AVERAGE.



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Date Entered: 04/18/2005 **Print** **Date Last Modified:** 04/16/2009 **FINAL**

RBLC ID: WA-0320
Corporate/Company: CARDINAL FG COMPANY
Facility Name: CARDINAL FG COMPANY
Facility Description: 650 TON PER DAY FLOAT GLASS PLANT IN WINLOCK WA

State: WA **Zip Code:** 98596
County: LEWIS **Country:** USA
EPA Region: 10

Facility Contact Information:

Name: ALAN SLAVICH **E-Mail:** ASLAVICH@CARDINALCORP.COM
Phone: 7192 32 65 00

Agency Contact Information:

Agency: WA001 - WASHINGTON STATE DEPARTMENT OF ECOLOGY **Agency Link**
Contact: MR. BERNARD BRADY
Address: WA STATE DEPT. OF ECOLOGY
 AIR QUALITY PROGRAM
 P. O. BOX 47600
 OLYMPIA, WA 98504-7600
Phone: (360)407-6803
Contact Info: BERNARD BRADY 360 407 6803 BERNARD@DECY.WA.GOV

Permit Number: PSD 03-03 FIRST AMENDMENT **EST/ACT DATE**
Application Accepted Date: ACT 01/29/2008
Permit Issuance Date: ACT 02/14/2008
Permit Type: A: New/Greenfield Facility
Permit Number: 110031259956
SIC Code: 3111
NAICS Code: 327211

PERMIT URL:

Affected Class I / U.S. Border Area:

Distance to Area	Area Name

- km
- 143 km Alpine Lakes, WA
- 81 km Goat Rocks, WA
- 80 km Mount Adams, WA
- 121 km Mount Hood, OR
- 74 km Mount Rainier NP, WA
- 141 km Olympic NP, WA

Facility-Wide Emission Increase/Decrease:

(After prevention/control measures)

Pollutant	Increase (+)/Decrease (-), Tons/Year
Carbon Monoxide	772.0000
Nitrogen Oxides (NOx)	883.0000
Particulate Matter (PM)	121.0000
Sulfur oxides (SOx)	72.0000
Volatile Organic Compounds (VOC)	56.0000

Other Permitting Information:

EPA NUMBER HAS NOT BEEN ASSIGNED YET. FIRST AMENDMENT ALLOWED SOURCE TESTING AT LESS THAN 90% OF RATED CAPACITY IF PRODUCTION IS SUBSEQUENTLY LIMITED TO 10/9THS OF THE LEVEL USED FOR THE SOURCE TEST.



http://efpub.epa.gov/ttn/index.cfm?action=PermitDataProcessInfo&Facility_ID=260268&Process_ID=103283
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High
FINAL

RBLC ID: WA-0370
Corporate/Company: CARDINAL FG COMPANY
Facility Name: CARDINAL FG COMPANY
Process: FLOAT GLASS FURNACE

Pollutant Information - List of Pollutants

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	432,0000 LB/H	BACT-PSD	UNKNOWN
Nitrogen Oxides (NOx)	7,0000 LB/T	BACT-PSD	UNKNOWN
Particulate matter, filterable < 10 µ (FPM10)	0,0900 LB/T	BACT-PSD	UNKNOWN
Sulfur Oxides (SOx)	16,3000 LB/H	BACT-PSD	UNKNOWN
Volatile Organic Compounds (VOC)	0,1000 LB/T	BACT-PSD	UNKNOWN

Process Notes:



https://efpub.epa.gov/ttn/index.cfm?action=PermitDataProcessInfo&Facility_ID=260268&Process_ID=103283&Pollutant_ID=488&Page=6&PageType=Facility
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High
FINAL

RBLC ID: WA-0320
Corporate/Company: CARDINAL FG COMPANY
Facility Name: CARDINAL FG COMPANY
Process: FLOAT GLASS FURNACE

Pollutant: Carbon Monoxide
CAS Number: 630-08-0
Pollutant group (s): Inorganic Compounds,
Substance Registry System: Carbon Monoxide

P2/Add-on Description: GOOD COMBUSTION PRACTICE
Pollution Prevention/Aid-on Control Equipment/Both/No Controls Feasible: P

High
FINAL

Test Method: Unspecified

Percent Efficiency: 0
Compliance Verified: Unknown
Emission Limits: BACT=PSD
Case-by-Case Basis: BACT=PSD
Other Applicable Requirements: No
Other Factors Influence Decision: 432,0000 LB/H 24-H AV
Emission Limit 1: 6,5000 LB/T LB CO/TON=GLASS, ANNUAL
Emission Limit 2: 0
Standard Emission Limit: 0
COST DATA: No
Cost Verified: No
Dollar Year Used in Cost Estimates: 2005
Cost Effectiveness: 0 \$/Ton
Incremental Cost Effectiveness: 0 \$/Ton
Pollutant Notes: ADDITIONAL LIMITS: 2.16 LB PER MBTU (L-HR AVG), 6.5 LB PER TON GLASS (ANNUAL AVG)



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Technology Transfer Network Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
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Final
FINAL

RBLG ID: WA-0320
Corporate/Company: CARDINAL FG COMPANY
Facility Name: CARDINAL FG COMPANY
Process: FLOAT GLASS FURNACE

Pollutant: Particulate matter, filterable < 10 µ (FPM10) CAS Number: EM

Pollutant Group: Particulate Matter (PM), Substance Registry System: Particulate matter, filterable < 10 µ (FPM10)

(s): Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A
P2/Add-on Description: ESP

Test Method: Unspecified

Percent Efficiency: 95.000
Compliance Verified: Unknown
EMISSION LIMITS: BACT=PSD
Case-by-Case Basis:
Other Applicable Requirements: Unknown
Other Factors Influence Decision: 0.0000 LB/T FILTERABLE, 24-Hr AV, LB/T GLASS
Emission Limit 1: 0.0500 LB/T CONDENSABLE, 24-Hr AV, LB/T GLASS
Emission Limit 2: 0.0500 LB/T
Standard Emission Limit: COST DATA:
Cost Verified? No
Dollar Year Used in Cost Estimates: 2005
Cost Effectiveness: 0 \$/ton
Incremental Cost Effectiveness: 0 \$/ton
Pollutant Notes: NOTE: THE 95% EFFICIENT PM10 REMOVAL IS FOR FILTERABLE AND CONDENSABLE COMBINED. ADDITIONAL LIMITS: 0.0122 LB/MBTU, CONDENSABLE: 0.115 LB/MBTU (24-HR AVG)



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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
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Final
FINAL

RBLG ID: WA-0320
Corporate/Company: CARDINAL FG COMPANY
Facility Name: CARDINAL FG COMPANY
Process: FLOAT GLASS FURNACE

Pollutant: Nitrogen Oxides (NOx) CAS Number: 10102

Pollutant Group: Inorganic Compounds, Oxides of Nitrogen (NOx), Particulate Matter (PM), Substance Registry System: Nitrogen Oxides (NOx)

(s): Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: P
P2/Add-on Description: 3-R TECHNOLOGY

Test Method: Unspecified

Percent Efficiency: 48.000
Compliance Verified: Unknown
EMISSION LIMITS: BACT=PSD
Case-by-Case Basis:
Other Applicable Requirements: No
Other Factors Influence Decision: 7.0000 LB/T LB=NOX/TON=GLASS, 24-Hr AV
Emission Limit 1: 0
Emission Limit 2: 0
Standard Emission Limit: COST DATA:
Cost Verified? No
Dollar Year Used in Cost Estimates: 2005
Cost Effectiveness: 0 \$/ton
Incremental Cost Effectiveness: 0 \$/ton
Pollutant Notes:

