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POLYSTYRENE
AP-42
Section 5.13.3
Reference Number
16

BASF Wyandotte Corporation

BASF

100 Cherry Hill Road
P.O. Box 181
Parsippany, N.J. 07054
201/263-3400

Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

Certified Mail
R357-290-881

Return Receipt Requested

February 18, 1983

United States Environmental
Protection Agency
Office of Air Quality Planning
and Standards
Research Triangle Park, N.C. 27711

Re: Request for Information - Polymers and Resins Manufacturing Plants

Attn: Mr. J. R. Farmer

Gentlemen:

BASF Wyandotte Corporation (BWC) submits the attached information in response to your request for information on our expandable polystyrene facility in South Brunswick, New Jersey. BWC considers all the attached information business sensitive and furthermore considers select portions of the attached business confidential. This business confidential information is so marked and has been segregated from the other information provided. The business confidential information is contained in Appendix I.

Very truly yours,

BASF WYANDOTTE CORPORATION

ADGille

Arthur D. Gillen, Manager
Corporate Environmental Protection

if
attachment

A. GENERAL INFORMATION

1. Polymer name - Expandable Polystyrene Beads

2. BASF Wyandotte Corporation
South Brunswick Works - Cranbury Road
Jamesburg, New Jersey 08831

3. Contact - AD Gillen - Corp. Env. Prot.
BASF Wyandotte Corporation
Box 181
Parsippany, New Jersey 07054

4. Date information completed - 17 Feb 83

B. OVERALL PROCESS INFORMATION

1. Annual process capacity is approximately 175 million pounds expandable polystyrene beads with no appreciable seasonal variation.

2. The process used in production is batch suspension polymerization.

3. Process block diagram with VOC emission points, control devices is business confidential and is given in Figure 1, Appendix I. A brief process description is below.

Production at BASF Wyandotte Corporation's South Brunswick Works consists of synthesis and finishing operations to produce approximately 175 million pounds/year of expandable polystyrene.

Synthesis involves the batch suspension polymerization of styrene monomer in water at elevated temperature and pressure. Various chemical additives are introduced to the reactor to impact the desired properties in the expandable polystyrene bead. Molecular weight of the polymer is controlled by type and concentration of catalyst and the time - temperature cycle in the reactors.

Finishing of the expandable polystyrene consists of washing beads to remove colloidal solids and salts. Following washing, beads are dried at low to moderate temperatures to drive off the surface moisture.

Various additives are utilized to improve process characteristics of the product. Final operations consist of screening into specific particle size ranges and packaging into small quantity containers, usually 1000 lbs.

4. There are approximately 10 pumps, no compressors and 175 valves which handle VOCs.

C. POLYMERIZATION PROCESS

1. The process flow sheet for the polymerization section with VOC emission points shown is business confidential and is given in the upper left hand corner of Figure 1, Appendix I. The expanding agent, and its point of introduction is business confidential and supplied in Appendix I.

2. Permitted VOC emission data for the polymerization section processes are given in Table 1 and include mix tanks, regranulator hoppers and reactors.

3. There is no known composition variation.

4. Compositions and flow rates given in Table 1 were calculated using material balances and equilibrium data. The accuracy level has neither been evaluated nor challenged.

5. Reliable sampling and analytical procedures have not been established and the ease of sampling varies from near impossible (the mix tanks) to difficult (the reactors).

D. MATERIALS RECOVERY/SEPARATION PROCESS

1. The process flow diagram for materials recovery/separation processes, with VOC emission points shown, is business confidential and is given in Figure 1, Appendix I.

2. Permitted VOC emission data for the materials recovery/separation processes are given in Table 2 and include buffer tanks, wash tank, flash dryers, long time dryers, weigh hoppers, coating mixers, blenders, discharge hopper storage bunkers, conveying systems and storage silos.

3. There is no known composition variation.

4. Compositions and flow rates given Table 2 were calculated using material balances and equilibrium data. The accuracy level has neither been evaluated nor challenged.

5. Reliable sampling and analytical procedures have not been established and the ease of sampling is near impossible.

E. ENGINEERING DESCRIPTION OF CONTROL DEVICES SPECIFIED IN B3

Process VOC emission are controlled by incineration in a 55 million Btu/hr boiler which fires natural gas or No. 6 fuel oil as a primary fuel and uses the off gas from all reactors and select dryers as supplemental fuel. A general assembly drawing (with dimensions) of the boiler is given in Figure 2. The approximate capital cost for the control device system was $1,600,000. installed in 1980 dollars. An annual operating cost is not applicable as the boiler produces process steam which is utilized by the facility.

TABLE 1

BASF WYANDOTTE CORPORATION

SOUTH BRUNSWICK WORKS

POLYMERIZATION PROCESS PERMITTED VOC EMISSION DATA

SOURCE	VOC	PERMITTED EMISSION pph	VOLUMETRIC %	FLOW RATE	TEMP °F	PRESSURE	CONTINUOUS	DURATION hr	FREQUENCY per day
Mix Tank R-201	ACN	0.1	0.15	70	70	Atm	No	1-2	8
	Styrene	0.9	0.10						
Mix Tank V-1302	ACN	0.06	0.39	9.1	70	Atm	No	1-2	6
	Styrene	0.9	0.63						
Mix Tank D-600	ACN	0.22	0.56	34.1	70	Atm	No	1-2	6
	Styrene	1.75	0.32						
Regranulator Hopper									
H-600	Pentane	0.001	10 ppm	3.5	80	Atm	No	0.25	6
H-601	Pentane	0.001	10 ppm	3.5	80	Atm	No	0.25	6

TABLE 2

BASF WYANDOTTE CORPORATION

SOUTH BRUNSWICK WORKS

MATERIAL RECOVERY/PROCESS SEPARATION SECTION PERMITTED VOC EMISSION DATA

SOURCE	VOC	PERMITTED EMISSION pph	VOLUMETRIC %	FLOW RATE ACFM	TEMP °F	PRESSURE	CONTINUOUS	DURATION hr	FREQUENCY per day
ıffer Tank No. 1	Pentane	0.01	0.004	25	75	Amb	No	1	5
ıffer Tank No. 2	Pentane	0.01	0.004	25	75	Amb	No	1	5
ıffer Tank No. 3	Pentane	2.7	0.87	27	86	Amb	No	1	5
ıffer Tank No. 4	Pentane	2.7	0.87	27	86	Amb	No	1	5
ıffer Tank D-607	Pentane	0.07	0.008	75	95	Amb	No	1	5
ısh Tank TK-400	Pentane	0.5	0.14	31	80	Amb	Yes		
lash Dryer 221	Pentane	9.9	0.029	3000	90	Amb	Yes		
lash Dryer 401	Pentane	12.4	0.025	4300	100	Amb	Yes		
ɔng Time Dryer V-210	Pentane	6.2	0.099	550	90	Amb	Yes		
ɔng Time Dryer V-320	Pentane	6.2	0.099	500	90	Amb	Yes		
ɔng Time Dryer BR-210	Pentane	2.3	0.051	400	100	Amb	Yes		
ɔng Time Dryer BR-310	Pentane	9.3	0.204	400	100	Amb	Yes		
ɔng Time Dryer BR-410	Pentane	3.9	0.086	400	100	Amb	Yes		

ıBLE 2 cont.

SOURCE	VOC	PERMITTED EMISSION pph	VOLUMETRIC %	FLOW RATE ACFM	TEMP °F	PRESSURE	CONTINUOUS	DURATION hr	FREQ. per day
·oduct Weigh Hopper 440B	Pentane	0.001	10 ppm	4.1	80	Amb	No	0.13	148
·oduct Weigh Hopper 440C	Pentane	0.001	10 ppm	3.5	80	Amb	No	0.13	111
:oduct Weigh Hopper 441B	Pentane	0.001	10 ppm	4.4	80	Amb	No	0.13	148
›ating Mixer 405A	Pentane	0.08	10 ppm	600	100	Amb	No	0.25	100
›ating Mixer 405B	Pentane	0.08	10 ppm	600	100	Amb	No	0.25	100
›ating Mixer 406	Pentane	0.04	10 ppm	300	100	Amb	No	0.25	100
lender 440B	Pentane	0.001	10 ppm	18.3	100	Amb	No	0.02	148
lender 440C	Pentane	0.001	10 ppm	18.3	100	Amb	No	0.02	111
lender 441B	Pentane	0.001	10 ppm	18.3	100	Amb	No	0.02	148
lender BL-460	Pentane	0.001	10 ppm	18.3	100	Amb	No	0.02	174
ischarge Hopper H-451	Pentane	0.001	10 ppm	17.7	80	Amb	No	0.02	148
ischarge Hopper H-453	Pentane	0.001	10 ppm	17.7	80	Amb	No	0.02	111
ischarge Hopper H-452B	Pentane	0.001	10 ppm	17.7	80	Amb	No	0.02	148

BLE 2 cont.

SOURCE	VOC	PERMITTED EMISSION pph	VOLUMETRIC %	FLOW RATE ACFM	TEMP °F	PRESSURE	CONTINUOUS	DURATION hr	FREQ. per day
scharge Hopper H-461	Pentane	0.001	10 ppm	17.7	80	Amb	No	0.02	174
ɔduct Storage Bunker 404A	Pentane	0.08	10 ppm	2.5	70	Amb	Yes		
ɔduct Storage Bunker 404B	Pentane	0.08	10 ppm	2.5	70	Amb	Yes		
ɔduct Storage Bunker 404C	Pentane	0.08	10 ppm	2.5	70	Amb	Yes		
Conveying Systems	Pentane	1.0	0.02	850	70	Amb	Yes	See Note 1	
st Collector DC-414	Pentane	0.54	0.02	217	100	Amb	Yes		
Storage Silos	Pentane	0.25	0.38	5.8	85	Amb	Yes	See Note 2	
orage Silo SL-486	Pentane	0.21	0.74	2.5	85	Amb	Yes		
iler E-903	Pentane	0.61	0.03	17331	315	Amb	Yes		
	Styrene	0.003	<1 ppm						

te 1: The values given are maximum values for each of the 13 conveying systems.

te 2: The values given are for each of 8 storage silos.