

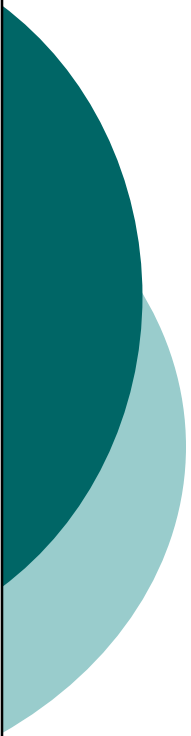


Efficient Performance of Annular Type Sugar Dust Collector

By

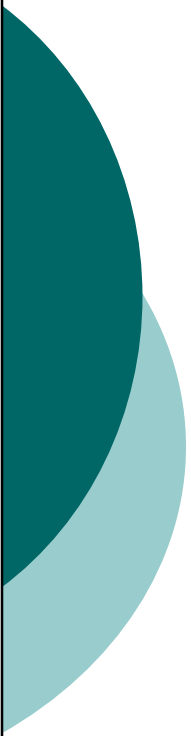
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Abstract:

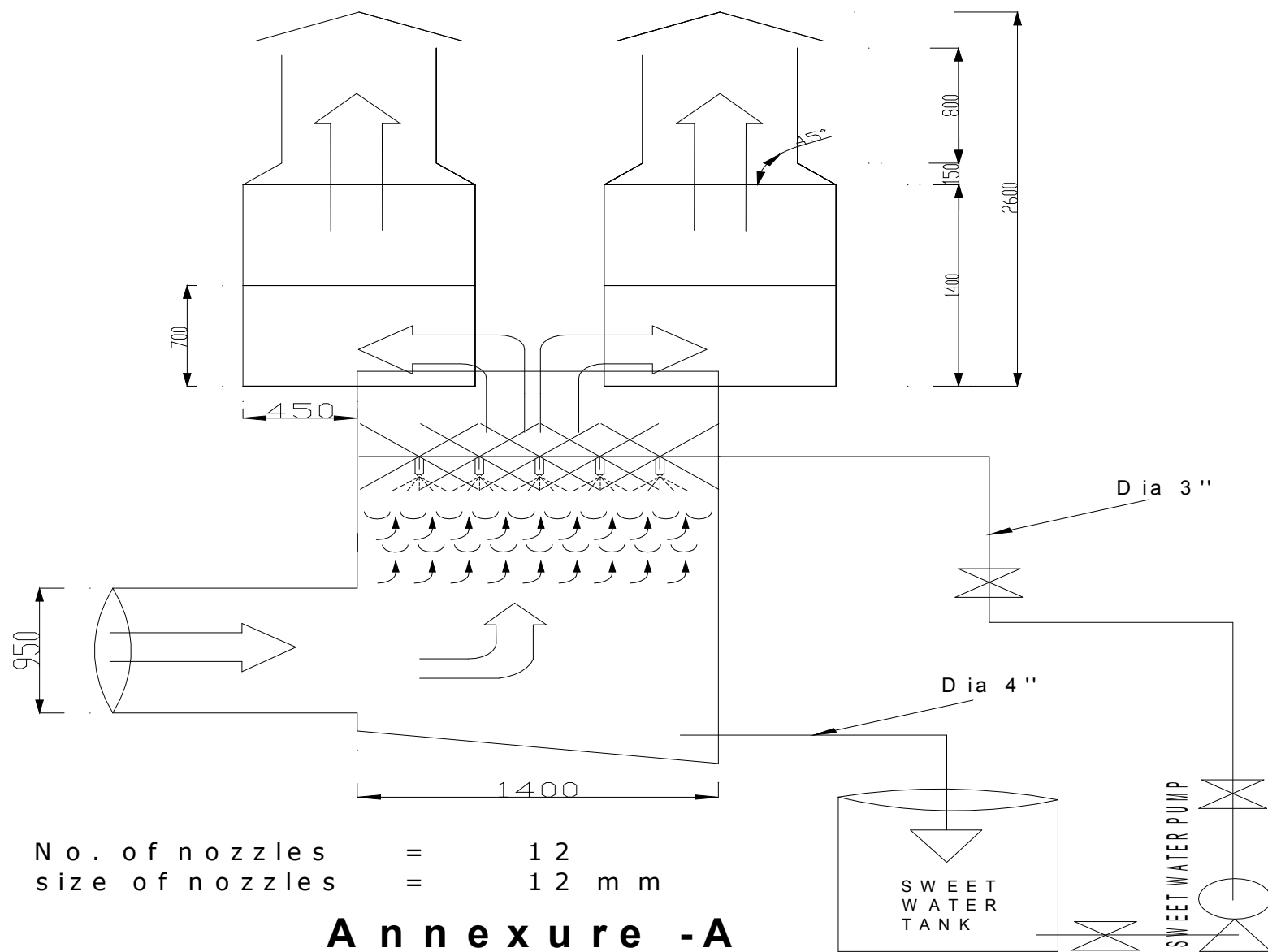
- Sugar dust separation from the hot air vented from sugar dryer is not a big issue but have made it complex at many locations. Under line paper presents the design and performance of local made Annular type sugar dust collector. The design is based on the path deflection of sugar dust at 360 degree after passing through 90 degree bend followed by hot water spray in counter flow of sugar dust. The annular design dust collector was installed at fluidized bed sugar dryer No.2 at Ranipur Sugar Mills. The performance detail in comparative with the installed unit of dust collector at fluidized bed sugar dryer No.1 is shown. Results of Annular type dust collector are very much alluring. The Annular type dust collector is maintenance free, lighter in weight, simple in design & fabrication and also easy in installation and operation.



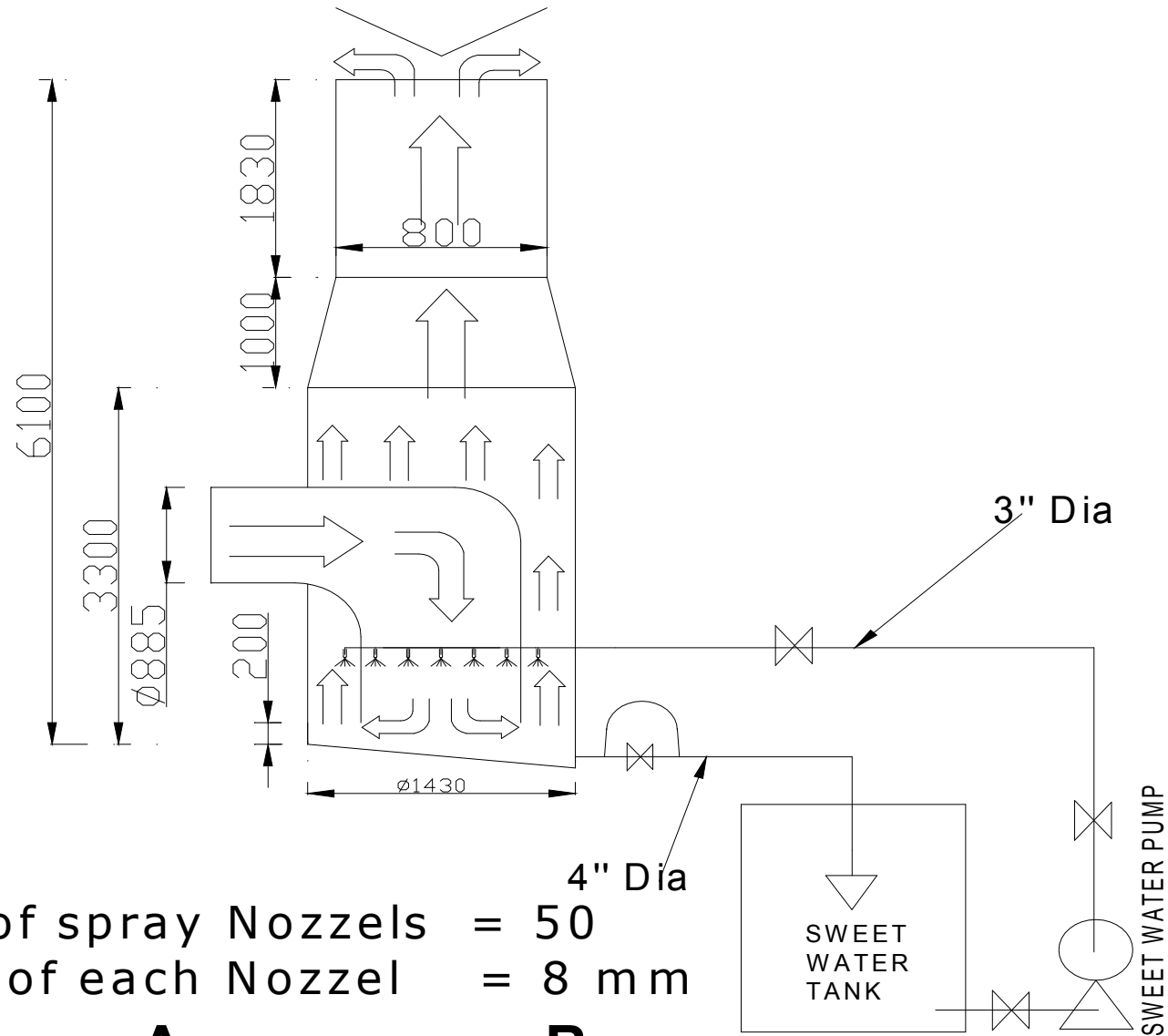
Introduction:

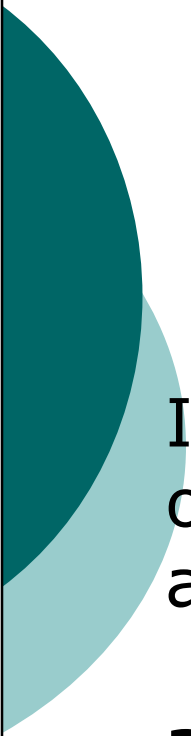
- At Ranipur Sugar Mills two sugar dryers are installed each of 20 tons/hr capacity. Normally one sugar dryer is operated and second one served as standby. In Season 2010-11, both dryers were coupled with single dust collector (No.1). Dust catching problem was observed when both dryers were operated in parallel due to capacity limitation of the single dust collector. In off season 2011, second dryer was isolated from the dust collector No.1 and made it in line with home made sugar dust collector No.2. The sketch of Sugar dust collector No.1 called as "Shower Type" and Sugar Dust Collector No.2 called as "Annular Type" are annexed as A and B.

Sketch of Shower Type sugar Dust Collector No.1



Sketch of Annular Type Sugar Dust Collector No.2





Material and Methods

In season 2011-12, both sugar dryers operated mostly as a single unit at a time and occasionally as parallel.

a- Summary of electric Load

Summary of electric load operation of sugar dryers and specification of water circulation pump for both sugar dryer are given in Table No.1

Technical details of the both Sugar Dryers (Identical Units)
Table No.1

a. Water Circulation pump specification

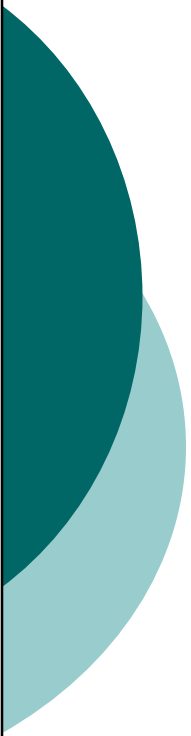
Capacity = 20 Cub.M/Hr

Head = 20 M

Installed Load = 7.50 HP

b. Electric Load detail of sugar dryers

Description	Installed Load		Running Ampere	Rpm
	Hp	Ampere		
Drive unit	10	15.6	11 - 12	1450/356
Hot Air Blower No.1	3	4.5	2 - 3	2900
Hot Air Blower No.2	3	4.5	2 - 3	2900
Hot Air Blower No.3	3	4.5	2 - 3	2900
Cold Air Blower No.1	3	4.5	2 - 3	2900
Cold Air Blower No.2	3	4.5	2 - 3	2900
Dust Catching ID Fan	10	15.6	13 - 14	1450



Material and Methods: (Continued)

b. Performance parameters

Table No.2, below shows the performance parameters of each dust collector for the operation of 8 hrs interval as a single unit keeping almost equal sugar flow and other operational parameters in both cases.

Table No.2 - A
Laboratory Data of Wet and Dry Sugar Moisture and Water
circulated Pol reading at Sugar Dust Collector No.1

Sugar Dryer No.1			
Dated:		Feb.28, 2012	
Sugar Production:			110 Tons
Shift Hours	Moisture %*		Dust Collector #1
	Wet Sugar	Dry sugar	Pol Reading ^o
1600 – 1700	0.19	0.06	1.10
1700 – 1800	0.18	0.05	1.70
1800 – 1900	0.17	0.05	2.40
1900 – 2000	0.18	0.05	3.80
2000 – 2100	0.17	0.06	4.20
2100 – 2200	0.19	0.06	5.40
2200 – 2300	0.19	0.06	6.70
2300 – 2400	0.17	0.05	8.40
Avg: Moist %	0.18	0.055	
Rise in Pol Reading			7.30

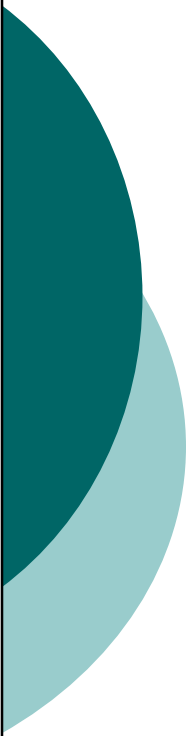
Uniform method of Chemical Control for Pakistan Cane Sugar Factories , Page 135

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Uniform method of Chemical Control for Pakistan Cane Sugar Factories , Page 130

Table No.2-B
Laboratory Data of Wet and Dry Sugar Moisture and Water
circulated Pol reading at Sugar Dust Collectors of No.2.

Sugar Dryer No.2			
Dated:		Feb.28, 2012	
Sugar Production:			120 Tons
Shift Hours	Moisture %*		Dust Collector #2
	Wet Sugar	Dry Sugar	Pol Reading°
0000 – 0100	0.19	0.06	0.90
0100 – 0200	0.17	0.04	2.00
0200 – 0300	0.18	0.05	3.80
0030 – 0040	0.18	0.05	8.60
0040 – 0050	0.19	0.05	12.30
0050 – 0060	0.17	0.04	15.80
0060 – 0070	0.19	0.06	17.20
0070 – 0080	0.17	0.05	19.40
Avg Moist %	0.18	0.05	
Rise in Pol Reading			18.50

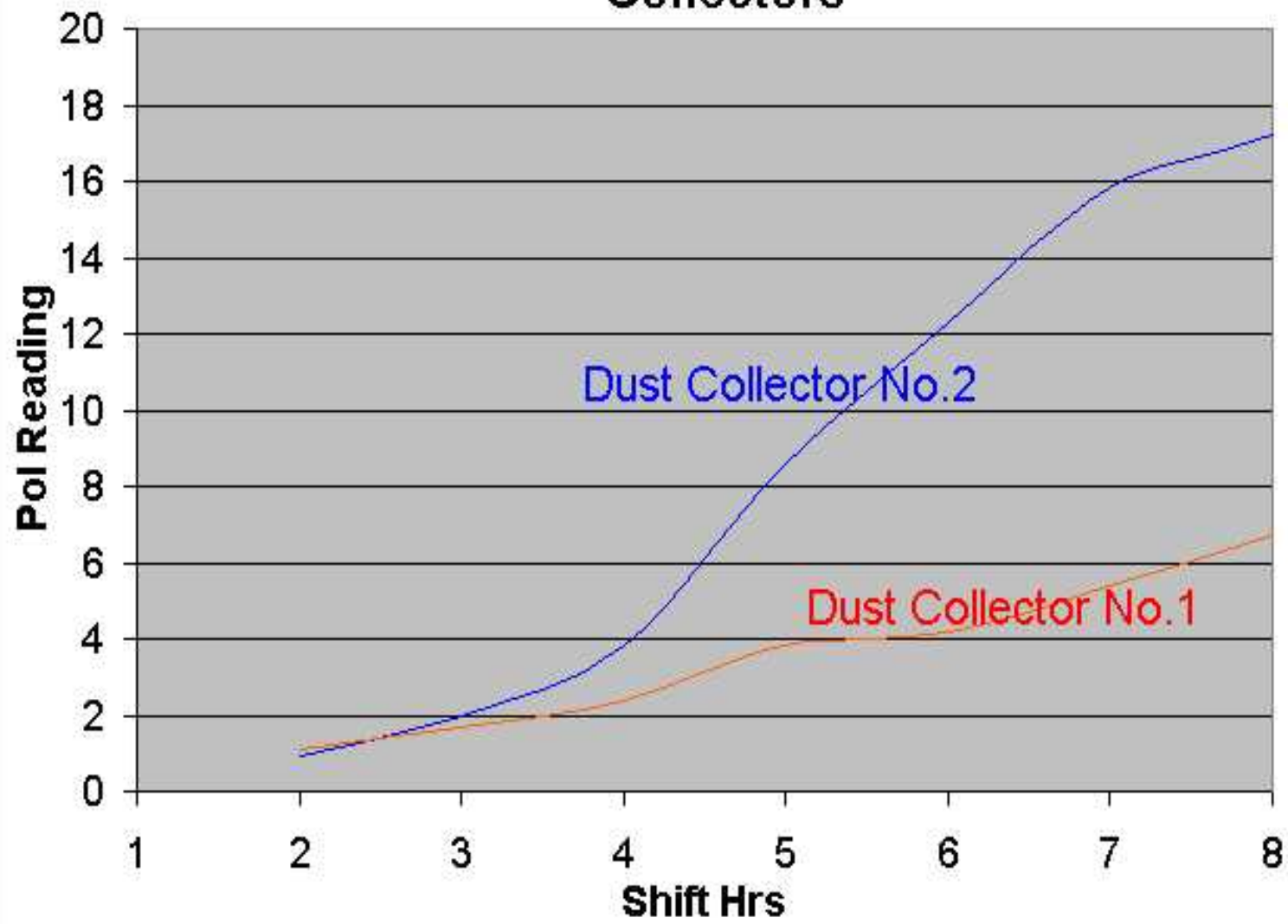


Material and Methods: *(Continued)*

C- Performance Curves

Graph No.1 Shows below the pol reading rising curves of Sugar Dust Collectors No.1 and No.2 with respective to leading time of shift hours for 8 hours.

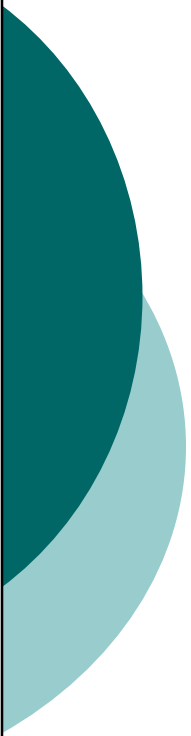
Graph No.1
Pol Reading Graph of Both Sugsr Dust
Collectors





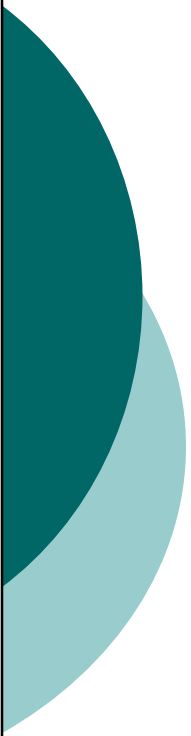
Principal Operation of Annular Type Dust Collector No.2

- Principal operation of annular type dust collector based on the path deflection of sugar dust and hot water spraying in counter flow of the dusty air. As shown in the sketch of annexure – B. The air carrying sugar dust particulars 1st strike with the deflection plate which breaks the velocity of dust particulars and heavy particulars can not return back at 360 degree due to gravitational forces.
- The remaining lighter particulars arrested in water spray during counter flow of the dusty air while leaving the dust collector. Spraying water dissolves the heavy and light dust particulars at the surface of deflection plate and takes these out while leaving the dust collector.
- The degree of the deflection plate also helps to flash out the semi dissolved sugar particulars with out going sweet water stream.
- The loop valve installed in out let water line serves to control the water level in the bottom of the sugar dust collector and also provide check to flash out dusty air with out flow water from the dust collector.



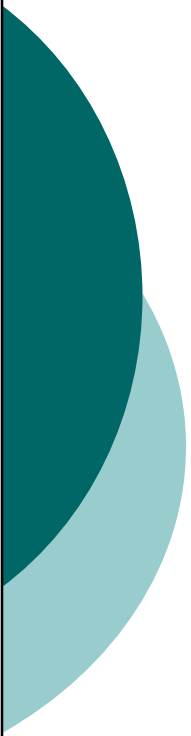
Results and Discussion:

1. Pol Graph shows;
 - Leading pol reading of the annular type home made dust collector in 8 hrs in comparative with Shower type sugar dust collector.
 - In other words, annular type dust collector recycles more sugar to process house than Shower type dust collector, hence it is more efficient than Shower type sugar dust collector.



Results and Discussion: *(Continued)*

2. Annular type dust collector is simple in design, erection, installation and operation.
3. Annular type Sugar Dust Collector requires no inside manual cleaning.



Conclusion:

- The Laboratory results indicate best performance of the annular type home made sugar dust collector. More over this is lighter in weight, cost economic, build in line, maintenance and trouble free in operation.

Thank You