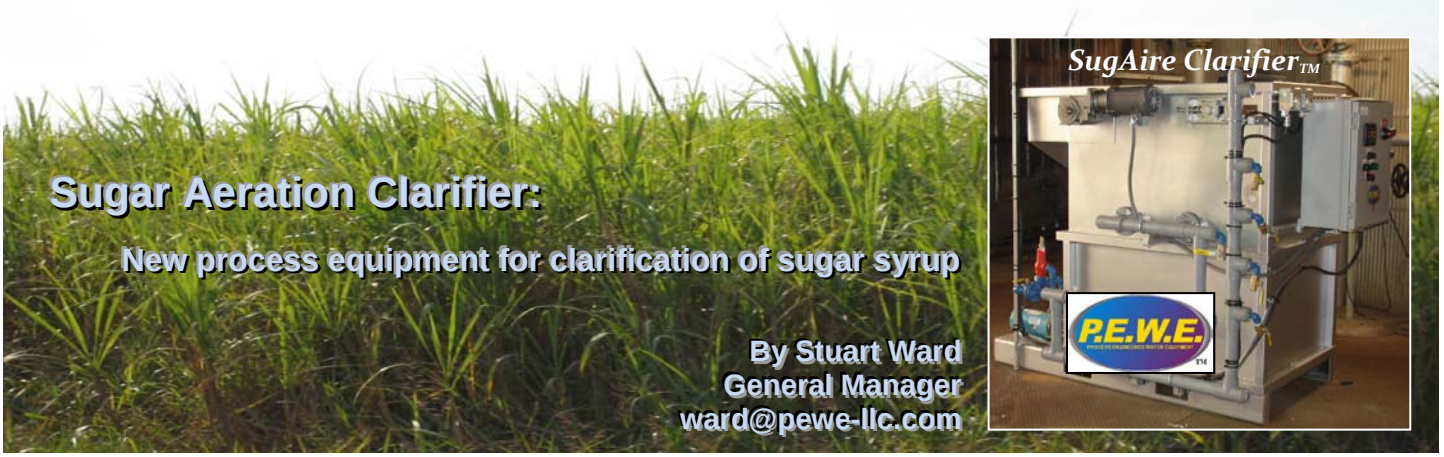
Process Engineered
Water Equipment, LLC



Summary

PEWE has developed a new patent pending sugar process equipment system for clarifying sugar syrup. It is the Sugar Aeration Clarifier, or commercially the PEWE ***SugAire Clarifier***™. The object of clarification is to eliminate the major portion of the impurities and/or solid materials in suspension within the syrup. The system utilizes several innovative patent pending process enhancement technologies. In its simplest terms, the machine injects very fine micro-bubbles into a chemically treated sugar stream in order to create separation between the syrup and any suspended impurities. The first such system, a pilot model PEWE *SPD-25* was demonstrated at the Lafourche Sugar Cooperative in Louisiana, USA.

Description

The Sugar Aeration Clarifier or PEWE ***SugAire Clarifier***™ comprises several operations. The system aerates the sugar syrup before subjecting it to filtration separation in order to obtain a retentate and a clarified filtrate. The system then concentrates and dewaters the retentate. Both the retentate (mud) and clarified filtrate (syrup) then pass separately downstream and are subjected to further sugar refining operations within the facility.

The process starts with the heated and chemically treated syrup passing through an integral pipe flocculator. This provides a continuous flow reaction to enhance the coagulation and flocculation of the suspended particles. As the particles agglomerate they are subjected to aeration with very fine 20-30 micron micro-bubbles from a Rogue Pump Company ***MAX RGT***™ regenerative turbine pump. The bubbles mix and attach themselves to the particles changing their density relative to the syrup.

The aerated sugar syrup next enters the Sugar Aeration Clarifier vessel where the filtration operation occurs. The system evenly distributes the influent sugar syrup and passes it through the separation process. Here solid particles rise to the surface of the vessel where they are concentrated for collection as a floating skim-able mud and are mechanically swept up a dewatering surface before falling into the solids hopper. From here the solids or mud are transferred for further plant reprocessing, while the clarified syrup is removed from the vessel with adjustable effluent weirs.

The Sugar Aeration Clarifier or PEWE ***SugAire Clarifier***™ reduces the production of molasses at later processing steps within the mill which in turn increases the yield. Significantly, discoloration is captured within the retentate mud as well. And the extraction yield of the sugar calculated at the entry to the crystallization stage increases significantly. These benefits represent a new and improved economical system for the mill to produce more sugar and at a higher consistent quality.

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Test Results

The Sugar Aeration Clarifier or PEWE ***SugAire Clarifier***™ test results from the Lafourche Sugar Cooperative study were very informative. A complete presentation of the findings were made at the American Society of Sugar Cane Technologists (ASSCT) LA Conference in 2009*. The abbreviated results are as follows:

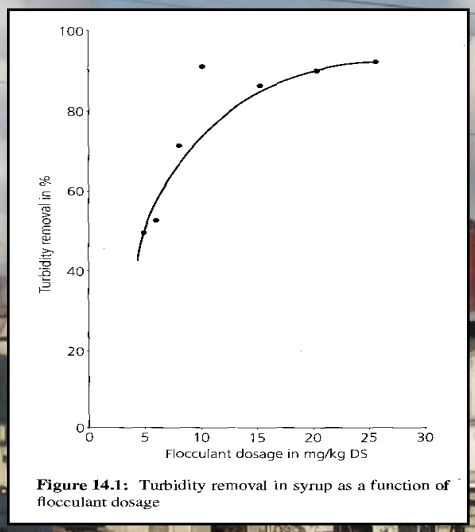
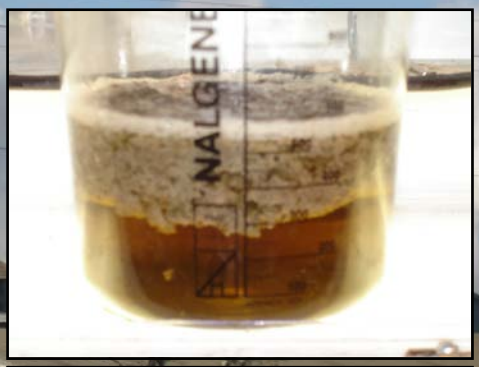
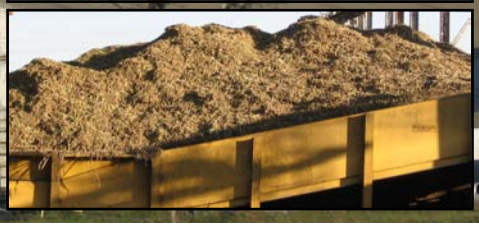


Figure 14.1: Turbidity removal in syrup as a function of flocculant dosage





Sample	Brix	pH	NTU	IU	cAsh, %
Control 1	60.59	6.72	1238	9012	2.00
Control 2	64.62	6.64	1687	10513	2.09
Control 3	67.99	6.63	1453	9369	2.06
Control 4	67.78	6.63	1371	9599	2.16
Control 5	66.03	6.64	1272	9752	2.17
Float 1	62.63	5.90	1161	9196	1.98
Float 2	60.86	5.67	770	9647	1.58
Float 3	61.76	5.57	753	9419	1.80
Float 4	62.03	5.49	738	9574	1.88
Float 5	62.25	5.47	686	9382	1.87
Dparameter, sample set:					
1	2.04	-0.82	-77	184	-0.02
2	-3.76	-0.97	-917	-866	-0.51
3	-6.23	-1.06	-700	50	-0.26
4	-5.75	-1.14	-633	-25	-0.28
5	-3.78	-1.17	-586	-370	-0.30
Dparameter, % of control sample set:					
1	3.37%	-12.20%	**-6.22%**	2.04%	**-1.00%**
2	-5.82%	-14.61%	**-54.36%**	-8.24%	**-24.40%**
3	-9.16%	-15.99%	**-48.18%**	0.53%	**-12.62%**
4	-8.48%	-17.19%	**-46.17%**	-0.26%	**-12.96%**
5	-5.72%	-17.62%	**-46.07%**	-3.79%	**-13.82%**

Presented by Mr. James Cuddihy

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