



# Pulverizers 101: Part 2

## What is Good Pulverizer Performance and How Can it be Measured?

There is an old saying, “if you can measure it, you can manage it.” I believe this was first stated by the late Peter Drucker, the leading management guru of the 20th century. The phrase applies to pulverizers as well. In order to manage combustion, the heart of the solid fuel combustion system has to be functioning at 100% optimized performance levels for about 8,000 hours per year. In this edition of our series on pulverizers, we aim to define what constitutes good pulverizer performance and how it can be measured.

WE HAVE CLASSIFIED THE PARAMETERS OF GOOD PULVERIZER PERFORMANCE INTO TWO SEPARATE CATEGORIES: **OBSERVABLE AND MEASURABLE.**

### IN THIS ISSUE:

- What is good pulverizer performance?
- How can you measure pulverizer performance?

To be continued...

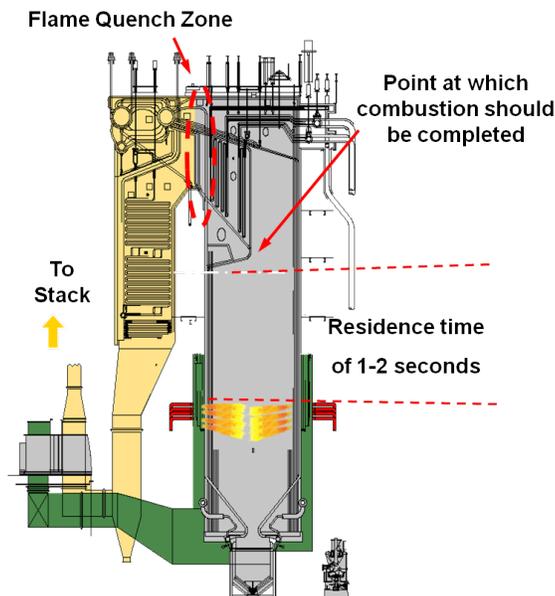
- Why pulverizers' primary air flow measurement, accuracy and fuel balance are important to boiler optimization
- How to achieve the best performance with Storm pulverizer components
- How to preserve furnace performance by applying Storm performance driven maintenance

### Observable Characteristics

Observable characteristics of good pulverizer performance include minimum coal rejects and no rumbling/skidding. Minimum coal rejects means that your primary airflow, grinding zone and throat areas are compatible and are operating correctly. Maintaining this level of performance is important since too many rejects can pose a fire risk. Rumbling or skidding may not pose a direct performance penalty, but it can affect the long term reliability of the pulverizer components. Lower maintenance costs is an indirect result of optimum pulverizer performance. Optimum performance needs to be 24/7 and about 8,000 hours per year and not just for a four hour test.

### Measurable Characteristics

We have also identified four different parameters of good pulverizer performance that are measurable. The first parameter is good fuel fineness. Fuel fineness is important and it is even more important than conventional power plant wisdom would indicate. The pulverized fuel leaving a pulverizer must be optimized to ensure best possible furnace performance.



The second measurable parameter is a good air and fuel balance. There is only a short amount of time to complete combustion in the furnace (it is usually about one to two seconds), so the air and fuel must be balanced to optimize performance. The pulverized coal, primary air flow, secondary air flow and over fire air flows must all mix. At least 99% of all combustible material must be burned by the entrance of the superheater/furnace exit section of the boiler furnace.

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## Measurable Characteristics Continued

important to ensure that the coal does not settle in the lines and create a potential fire hazard.

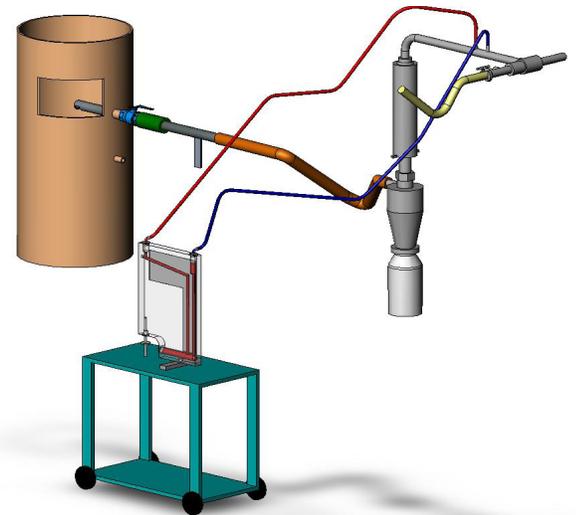
The third measurable parameter is mill outlet temperature. An adequate temperature is required so that the moisture is eliminated from the coal. The removal of the moisture is

## Measuring Pulverizer Performance

What is the best way to measure fuel fineness, distribution and air/fuel ratios? We believe it is by using the Storm isokinetic coal sampler. It has proven itself over many years and thousands of tests. It is best used in vertical up flow coal pipes as shown.

Each fuel line should be sampled for a minimum of 24 points. Then each sample from each of the coal pipes must be sieved and the coal flow rate, fineness and air/fuel ratio recorded for all of the coal pipes. We have seen fineness and fuel loading on one mill to range from very good to very poor. All of the burner lines must be balanced in flows and fuel fineness satisfactory. Good furnace performance, or to be more specific the burner belt performance, depends on having the inputs optimized.

The final measurable characteristic of good pulverizer performance is a proper air/fuel ratio. High air/fuel ratios create long flames, high upper furnace flue gas temperatures and contribute to poor fuel balance, poor fuel fineness and high NO<sub>x</sub> production.



Want to learn more? Contact the specialists at Storm and we will be pleased to discuss how we can assist you in measuring and optimizing pulverizer performance.

Yours truly,

Dick Storm  
CEO/Senior Consultant

Disclaimer: These suggestions are offered in the spirit of sharing our favorable experiences over many years. Storm Technologies, Inc. does not accept responsibility for actions of others who may attempt to apply our suggestions without Storm Technologies' involvement.

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