

Importance of Can Velocity for Test of Bag Filter Dust Collector

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Bag filter is used for collecting dust particles from gas stream. Testing the performance of a bag filter is done by comparing filter cleaning intervals and dust emission for different operation conditions. Since filtration velocity is a key parameter to determine the pressure drop behaviour of filter, it is very important to make the filtration velocity fixed during test. Theoretically the pressure drop increasing speed of bag filter will be same regardless of number of filter bags if filtration velocity and inlet dust concentration are fixed. For some test conditions, however, can velocity which is upward flow velocity in the passage between filter bags makes a big effect on pressure drop behaviour of filter. In this work we examined the influence of can velocity on filter pressure drop using a pilot scale bag filter test unit.

The pilot scale test unit has a square cross section of 750x750mm. Bag filter tests were conducted for 1 bag, 2 bags, 3 bags, 4 bags installation conditions and filtration velocity of 1.0, 1.5, and 2.0m/min. 3m-long filter bags of 156mm in diameter were used for test. Table 1 is the calculated can velocity for given test conditions.

Figure 1 shows pressure drop data during bag filter test. Filter cleaning was done when filter pressure drop came up 100mmH₂O by pulsing of compressed air. Filtration velocity was 1.0m/min, inlet dust concentration was 50g/m³, and fly ash from coal fired power plant was used as test dust. Upper one is a result for 1 bag test, middle one is for 2 bags, and lower graph is for 4 bags, respectively. The cleaning interval for 1 bag test is several times longer than others, and it becomes shorter as more bags are applied to. Average cleaning intervals for filtration velocities of 1.5 and 2.0 m/min were summarized in Figure 2. Compared to 1.0 m/min, there was only little difference between 2 bags, 3 bags, and 4 bags cases. From these results it can be concluded there exists a threshold of can velocity which gives a significant effect on results of bag filter test. It is recommended bag filter test should be done at a can velocity higher than 8 m/min.

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Table 1. Calculated can velocity for different filter bag installations (unit: m/min).

Filtration velocity, m/min	No. of Bags			
	1	2	3	4
1.0	2.76	5.72	8.91	12.3
1.5	4.14	8.58	13.4	18.5
2.0	5.52	11.4	17.8	24.7

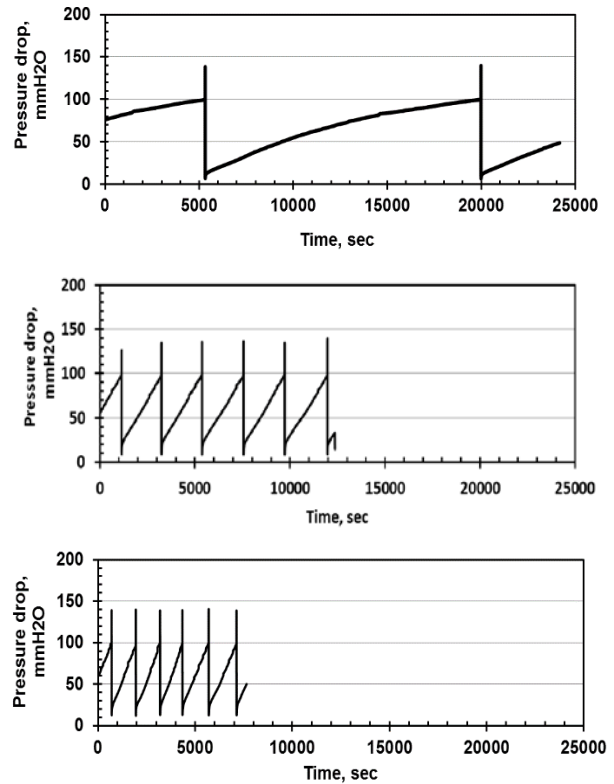


Figure 1. Filter cleaning results for the cases of 1 bag(upper), 2 bags(middle), and 4 bags(lower) installations at filtration velocity of 1.0m/min.

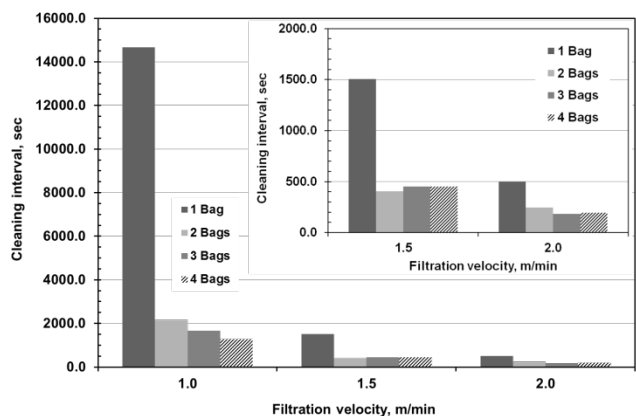


Figure 2. Filter cleaning intervals for various filter bag installations and filtration velocities.