

## **5.0 Indian Standard IS: 3812 - 2003- Part 1&2**

In this standard Pulverized Fuel Ash (PFA i.e. fly ash, bottom ash, pond ash or mound ash) has been divided in two categories viz. (i) Siliceous PFA normally produced by burning of anthracite or bituminous coal and contains reactive calcium oxide less than 10 percent by mass and (ii) Calcareous PFA normally produced by burning of lignite or sub bituminous coal and reactive calcium oxide is not less than 10% by mass. In this code quality requirement for these categories of PFA with respect to its chemical and physical composition has been specified. These requirements are given in table 1 & table 2 below:

**Table 1 – Chemical Requirements (Part-1 & 2)**

Sl. No.	Characteristic	Requirements	
		Siliceous PFA	Calcareous PFA
i)	<b>Silicon dioxide</b> ( $\text{SiO}_2$ ) + <b>Aluminium oxide</b> ( $\text{Al}_2\text{O}_3$ ) + <b>Iron oxide</b> ( $\text{Fe}_2\text{O}_3$ ), in percent by mass, Min..	70	50
ii)	<b>Silicon dioxide</b> in percent by mass, Min.	35	25
(iii)	<b>Reactive Silica</b> in percent by mass, Min (Optional Test)	20	20
iv)	<b>Magnesium Oxide</b> ( $\text{MgO}$ ), in percent by mass, Max.	5.0	5.0
v)	<b>Total sulphur as sulphur trioxide</b> ( $\text{SO}_3$ ), in percent by mass, Max.	3.0	3.0
vi)	<b>Available alkalis</b> as Sodium oxide ( $\text{Na}_2\text{O}$ ), percent by mass, Max.	1.5	1.5
vii)	<b>Total Chlorides</b> in percent by mass, Max	0.05	0.05
viii)	<b>Loss on Ignition</b> , in percent by mass, Max.	5.0	5.0

**Table 2 – Physical Requirements**

Sl. No	Characteristics	Part 1	Part 2
		Requirements for Siliceous and Calcareous PFA	
i)	<b>Fineness</b> -Specific surface in $\text{m}^2/\text{kg}$ by Blaine's permeability method, Min.	320	200
ii)	<b>Particles</b> retained on 45 micron IS sieve (wet sieving) in percent, Max. (Optional Test)	34	50
iii)	<b>Lime reactivity</b> – Average compressive strength in $\text{N}/\text{mm}^2$ , Min.	4.5	-
iv)	<b>Compressive strength</b> at 28 days in $\text{N}/\text{mm}^2$ , Min.	Not less than 80 percent of the strength of corresponding plain cement mortar cubes	
v)	<b>Soundness by autoclave test</b> -Expansion of specimen in percent, Max.	0.8	0.8

Part -1 for use as Pozzolana in cement, cement mortar and concrete and Part - 2 for use as admixture in cement mortar and concrete. Chemical requirements specified in part 1 are same for part 2.