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Chemical Analysis Regulations of Ceramic Sand

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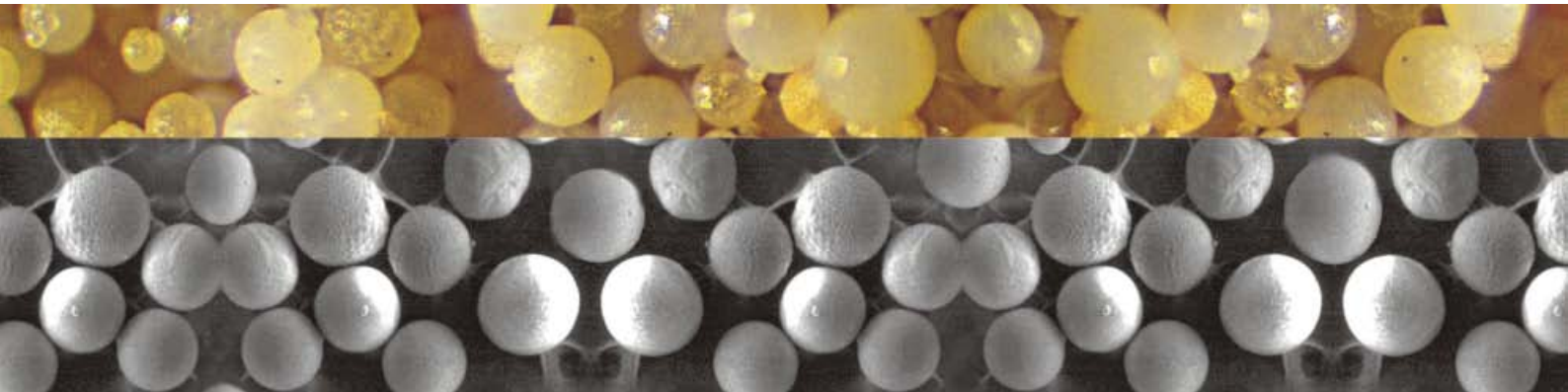

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Principles：

a. To test the chemical composition daily as a batch. Sampling requirements：
Get sand samples not less than 500 grams by every shift, mix this sand together thoroughly, obtain required samples by quartering.

b. After chemical composition analyzing, the qualified sands are permitted to go to the single mesh screening procedure, then to be storaged.

c. The sands unqualified will be down-graded, waiting for further handling.

d. By the requirements of customers, 5 sand samples of 100 grams from every batch (for every 20 to 40 tons) will beprepared then to get testing samples by quartering. Analyze the contents of AL_2O_3 and Fe_2O_3,and deliver this test report to customers.

These test reports shall be reported and maintained by the testing personnel.

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Chemical Analyzing Procedures：

1. Put sand samples of 500 grams into the grinding device,grind it for 4 minutes. The model of our sample grinding device is MZF-3 by DongxinAnalyzing Company.	  

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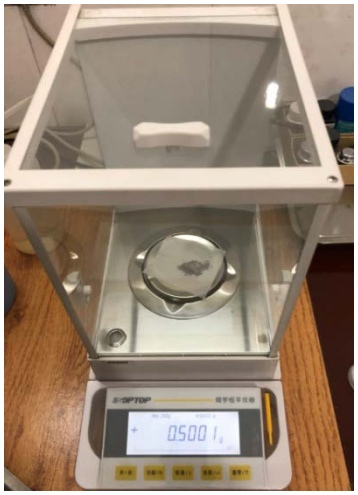
2. Remove the grinded sand flour from the grinding device,then put it onto a 270 mesh screen, discard those coarse particles on 270 mesh screen.	 
3. Weigh 2g of preparedreagent solution, put it into a platinum crucible. The electronic balance is model JE201T made by Shanghai Puchun Measuring Instrument Company.	
4. Weigh 0.5000g of grinded sand samples（accuracy；0.0001g），put into the reagent solution. The electronic balance is model FA made byShanghai Sunny Hengping Scientific Instrument Co., Ltd.	 
5. Prepare another 1g above mentioned reagent solution，put into a bottle，stir it，then cover the bottle.	

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6.Place the mixed sample in a high temperature furnace (if the furnace temperature rises from 800 to 1100℃,and the heating time exceeds 1h, then the furnace temperature should be declined from 1100 ℃ to 800 ℃ by opening the furnace door ,then put the crucible into the furnace) , continually to heat the furnace to 1100 ℃ to maintain 20-40 min. When the sample is completely decomposed, Remove the crucible, let the sample to be cooled in air. The high temperature furnace modeled HLX-14B is made by Luoyang Hengli Furnace and Kiln Factory.	 
7.Place the crucible in a beaker filled with 150-200ml boiling water and 20 ml of hydrochloric acid and heat until the melt is completely dissolved. Transfer the cooled test solution into a volumetric flask of 250ml and dilute it with water to scale indicated level and mix them thoroughly. (this solution can be used for iron, aluminum, titanium, calcium, magnesium determining)	 

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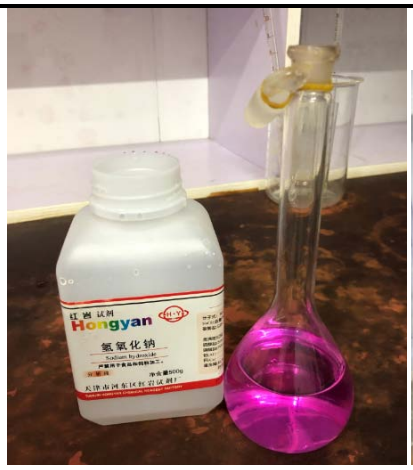
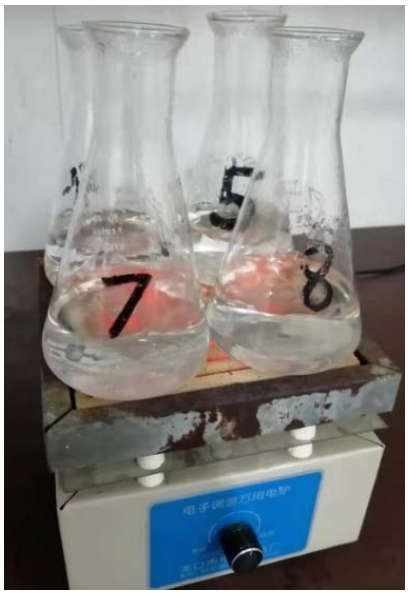
8.(Determining the content of aluminum oxide)

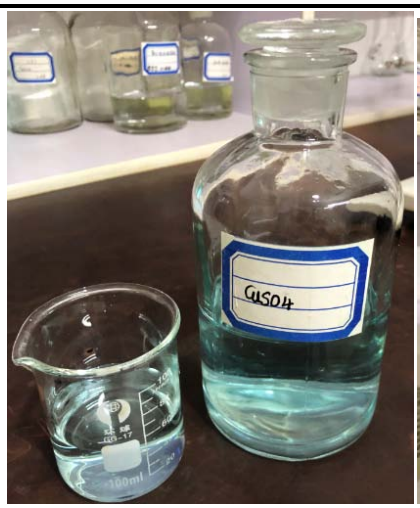
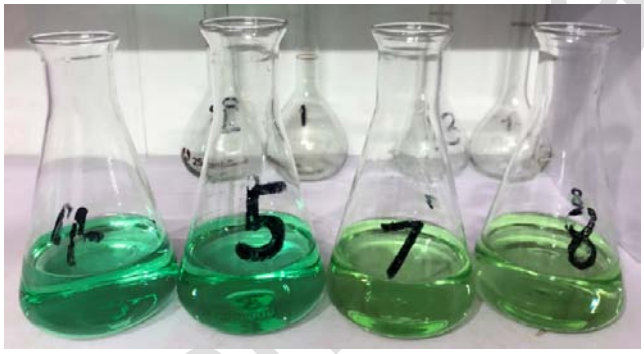
Fill in 50 ml of testing solution in a volumetric flask of 200 ml, dilute it to about 150 ml, add two drops of phenolphthalein solution, drop in sodium hydroxide solution when stirring, when the testing solution turns red , add 16 ml of sodium hydroxide to dilute to 180 ml. Keep 30 min on a water bath at 60-70 ℃, remove and cool it to room temperature, dilute with water to scale indicated level, mix it thoroughly, distill it for 10min ,then strain it with medium-speed filter paper.



9.(Determining the content of aluminum oxide)

Get 100ml of filtrate in the beaker, add 20-50ml EDTA standard solution (depending on aluminum content, generally excessive 5-10ml), use hydrochloric acid to make the test solution turn red, add 20 ml acetate-ammonium acetate solution, heat it to boil for five minutes, Add 5 ml nitro-R salt indicator to the cooled test solution, titrate the test solution with copper sulfate standard solution, which is the end point from regard the moment as the reaction terminal point when the mixture turns from yellow to



green and yellow-green finally.	  
10（Determining the content of iron oxide）Add 10ml of testing solution into a volumetric flask of 100m, add water to a volume of 50ml.	

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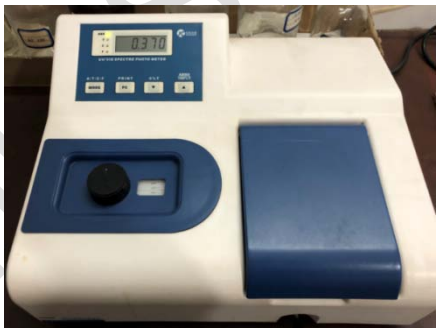
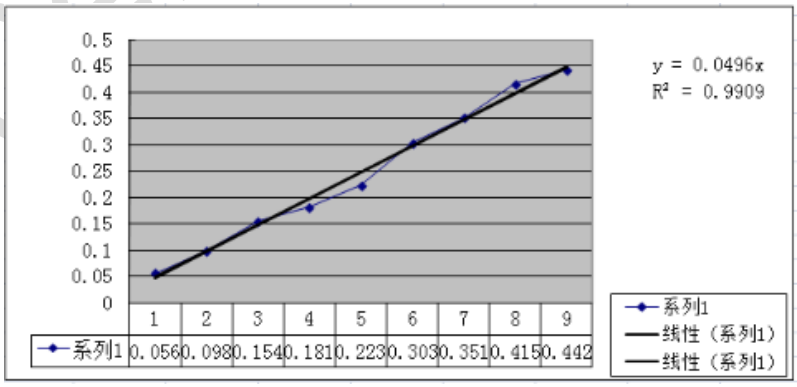
11. (Determining iron oxide content) add 10 ml of hydroxylamine solution, 5 ml of adjacent diazepam solution, and 10 ml of ammonium acetate solution, dilute all the mixture with water to scale indicated level, mix them thoroughly，then distill it for 30min.	
12.(Determining iron oxide content) Put the cuvette of 0.5cm color at the spectrophotometer wavelength 510nm of the spectrophotometer, contrast with the blank of the specimen as a reference, measure its light absorbance. The spectrophotometer modeled 722 is from Shanghai Yuke instrument Factory.	 
13.Respectively， put 0,1,2,3,4,5,6,7,and 8 ml of iron trioxide standard solution into a set of 100 ml volumetric flasks, add water to about a volume of 50 ml. Put the cuvette of 0.5cm color at the spectrophotometer wavelength 510nm of the spectrophotometer, contrast with the blank of the specimen as a reference, measure its light distribution.	

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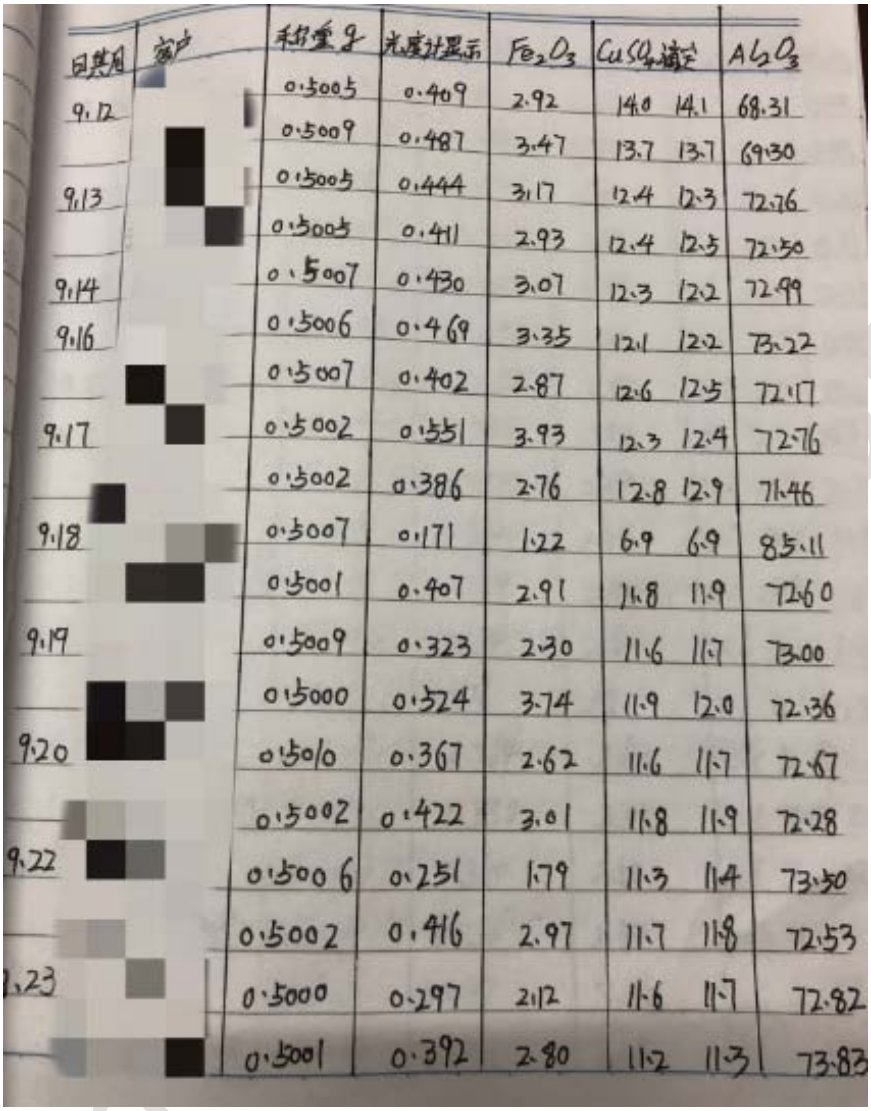
Intermediate Test Results of Testing Solution：



日期	客户	称样量g	光度计显示	Fe_2O_3	$CuSO_4$滴定		Al_2O_3
9.12		0.5005	0.409	2.92	14.0	14.1	68.31
		0.5009	0.487	3.47	13.7	13.7	69.30
9.13		0.5005	0.444	3.17	12.4	12.3	72.76
		0.5005	0.411	2.93	12.4	12.5	72.50
9.14		0.5007	0.430	3.07	12.3	12.2	72.99
9.16		0.5006	0.469	3.35	12.1	12.2	73.22
		0.5007	0.402	2.87	12.6	12.5	72.17
9.17		0.5002	0.551	3.93	12.3	12.4	72.76
		0.5002	0.386	2.76	12.8	12.9	71.46
9.18		0.5007	0.171	1.22	6.9	6.9	85.11
		0.5001	0.407	2.91	11.8	11.9	72.60
9.19		0.5009	0.323	2.30	11.6	11.7	73.00
		0.5000	0.524	3.74	11.9	12.0	72.36
9.20		0.5010	0.367	2.62	11.6	11.7	72.67
		0.5002	0.422	3.01	11.8	11.9	72.28
9.22		0.5006	0.251	1.79	11.3	11.4	73.50
		0.5002	0.416	2.97	11.7	11.8	72.53
9.23		0.5000	0.297	2.12	11.6	11.7	72.82
		0.5001	0.392	2.80	11.2	11.3	73.83

Calculations of Test Results：

The content of aluminum oxide：

$$\mathrm{Al2O3}(\%) = \frac{\mathrm{T}*(\mathrm{V1}-\mathrm{V2}*\mathrm{K})}{\mathrm{M}*\frac{\mathrm{V}}{250}*\frac{100}{200}} * 100$$

Where，

V1：the volume（ml）of EDTA standard solution added

V2：the volume（ml）of EDTA standard solution added for excessive titration

K： ratio，to convert the volume of copper sulphate to equivalent volume of EDTA standard solution

T: inter mediate factor，the aluminum oxide equivalent factor of the EDTA solution，in gram per millitre

M: mass of test sample，in gram

V: volume of testing solution used (ml)

The content of iron oxide：

$$Fe2O3(\%) = \frac{M1 * 10^{-6}}{M * \frac{V1}{V}} * 100$$

Where，

M1:Iron oxide content found out from the standard graph（ug）

M： Mass of test sample，in gram

V1：Volume of testing solution used (ml)

V：Totalvolume of testing solution used (ml)