Performace Comparison Report of Jiefa ES-7 Sodium Lignosulfonate Dispersants & REAX 85A

I. Experimental Objective

For this experiment, we are using the disperse blue 79 filter cake, which contains a high amount of tar. The aim is to compare the performance of Sodium Lignosulfonate Dispersant ES-7 with REAX-85A on this low-quality filter cake.

II. Experimental Items

1. Comparison of dispersing grinding time consumption (HG/T 3507-2008)
2. Comparison of dispersant heat stability (HG/T 3507-2008)
3. Comparison of bobbin yarn dyeing performance
4. Comparison of dispersant's high-temperature dispersibility (130℃) (GB/T 5541-2017)
5. Comparison of dispersant's polyester dye staining (HG/T 3507—2008)

III. Experimental Conditions

1.Comparison of dispersing grinding time consumption (HG/T 3507-2008)

1.1 Preparation of dye liquor

Weigh the dye filter cake and dispersant with a certain ratio. The ratio of filter cake to dispersant is 1:0.8. Add water, controlling the slurry's solid content to about 34%. After pre-dispersing on a homogenizer for 10 minutes, transfer to a sand mill. While stirring, pour in 200 grams of glass beads (diameter 0.75mm). The sand mill operates at a speed of 1500 r/min, adjusting the pH value to around 7.0. After sand milling, test the particle size of the material. When 90% of the particles are smaller than 1μm, terminate the sand milling. Filter the dispersed liquid using a 320-mesh sieve. Pour the solution into a clean, dry bottle, preserving it as the original dispersed liquid sample.

1.2 Diffusion Performance (HG/T 3399-2001)

At room temperature, use a graduated pipette to draw 0.2ml of dye dispersion liquid with a concentration of 0.5g/100ml. Drip the dye solution vertically onto qualitative fast filter paper, allowing it to naturally diffuse, grade after drying.

1.3 Dispersion Stability Test (71℃)

Weigh out (2.0±0.1)g of dye and place it in a 400ml beaker. Add 200ml of a 0.25g/L EDTA

solution. Stir for 3-5 minutes on a magnetic stirrer, then adjust the pH value to 4.5-5.0 using acetic acid solution. Then, place the beaker in a constant temperature water bath and, while continuously stirring, allow the temperature to reach 71℃ within 5-10 minutes. Preheat a funnel with the same temperature water. Filter through a double layer of Whatman filter paper (2# on top, 4# below) and grade the results.

1.4 Test Results

Sample	ES-7	REAX-85A
Grinding Time /min	150 	170 

2.Comparison of dispersant heat stability (HG/T 3507-2008)

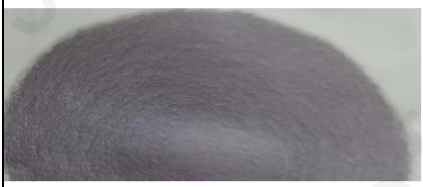
2.1 Preparation of the Dried Sample of the Dispersion(liquid)

Take 2 grams (accurate to 0.1 gram) of the aforementioned dispersion sample, and uniformly spread it onto a clean glass plate (100mm×150mm×3mm). Place the plate near the center of a forced circulation oven that's preheated to (150±1)℃ (two layers of cheesecloth should be placed beneath the glass plate). Dry for 5 minutes under forced air, then scrape the dried material into a collection bottle for further use, as the dried sample of the dispersion(liquid).

2.2 Evaluation

Evaluate the dispersion performance level of the aforementioned filter paper infiltration ring based on the test sample card specified in HG/T 3399, determining the heat stability of the sample.

2.3 Test Results

Sample	ES-7	REAX-85A
Heat Stability /℃	150 	145 
		150 

3.Comparison of bobbin yarn dyeing performance

Sample	ES-7	REAX-85A
Bobbin Yarn Results	No noticeable peaks, maximum pressure difference 0.2	No noticeable peaks, maximum pressure difference 0.3
Residue	4-5 Grade	3-4 Grade

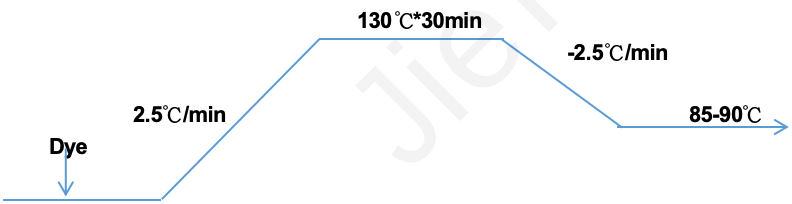
4.Comparison of dispersant's high-temperature dispersibility (130℃) (GB/T 5541-2017)

4.1 Experimental Procedure

4.1.1 Experimental Steps:

Place the filter paper - Turn on the vacuum pump - Pour dye solution onto the filter paper - record the drying time of the filter paper - Remove and dry the filter paper

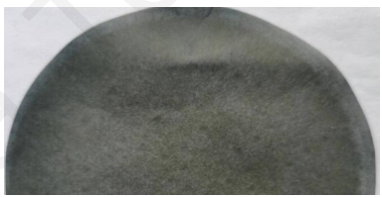
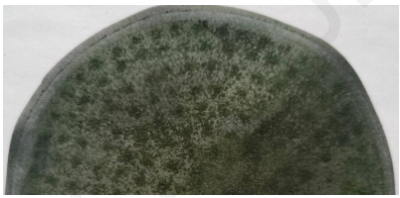
4.1.2 Dyeing Temperature Control Process



4.1.3 Test Results

Sample	ES-7	REAX-85A
Residue (130℃)	4.15%	7.1%
Filtration Time	17 S	22 S

4.1.4 High-temp Dispersibility - Filter Paper Result Comparison

Sample	ES-7	REAX-85A
High-temp Dispersibility		

5.Comparison of dispersant's polyester dye staining

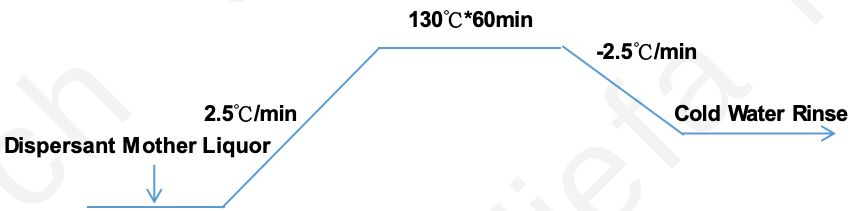
5.1 Experimental Conditions: Polyester Dye Staining (HG/T 3507—2008)

Dyed Textile: Polyester 2.0 grams; **Liquor Ratio:** 1:80; **Water:** Distilled water;

Temp * Time ： 130℃ * 60min → washing → drying

Note: Dispersant mother liquor preparation: 2g/500ml (adjusted to approximately pH 5.5 using 1% acetic acid)

5.2 Dyeing Temperature Control Process



5.3 Test Results

Using a white textile as a standard, the data evaluated by the colorimeter

Sample	ES-7	REAX-85A
CLE Db	9.88	11.95

5.4 Textile Sample Conditions

Sample	ES-7	REAX-85A
Textile Sample		

IV. Experimental Conclusion

4.1 Based on the results mentioned above, under the condition of consistent particle size and diffusion performance, the grinding time of Jiefa Lignosulfonate Dispersant ES-7 is shorter than REXA-85A.

4.2 Jiefa Lignosulfonate Dispersant ES-7 has better heat stability than REXA-85A. After drying the dispersed dyes at 150°C, the filter paper surface with REXA-85A showed dye particle aggregation. This indicates that the Jiefa ES-7 dispersant performs better in preserving the heat stability of disperse dyes.

4.3 From the test results of bobbin yarn dyeing, Jiefa Lignosulfonate Dispersant ES-7 does not agglomerate during the dyeing process as the temperature rises. Pressure difference between the inner and outer layers is minimum, and the dye liquor can smoothly flow between polyester yarns. Whereas, during the bobbin dyeing of REAX-85A, dye particles agglomerate at high temperatures, the pressure difference between the inner and outer layers increases, and there is more dye residue, indicating that the dyeing agent provides poor heat stability protection for the disperse dyes.

4.4 From the phenomena on the filter paper surface after the experiment and the data of residues, the high-temperature dispersion and tar removal performance of Jiefa Lignosulfonate Dispersant ES-7

is significantly better than REAX-85A. During high-intensity dyeing, it can prevent dyes from agglomerating at high temperatures, making dyeing more effective.

4.5 From the perspective of textile staining, the staining of Jiefa Lignosulfonate Dispersant ES-7 is significantly better than REAX-85A. The dispersant REAX-85A heavily stains the fibers, which can reduce the brightness and vividness of the fabric when dyeing in light colors.