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DISPERSIONS FOR THERMALLY STRESSED COATING SYSTEMS EVALUATION

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ABSTRACT

Styrene-acrylate or polyacrylate binder-based anticorrosive dispersion coatings are used for protection of reinforcing steel in porous concrete. The coating systems in this case must be resistent to the effects of increased temperature, pressure and alkali environment in the fresh porous concrete in the process of autoclave curing. Thermal stability of dispersions designed for the production of steel reinforcement protective coatings is determined by thermal analysis on the MOM Budapest apparatus. A testing method and criteria for obligatory evaluation of the dispersion thermal stability has been worked out by the state testing authority No 227.

The coating systems for corrosion protection of steel reinforcement in porous concrete have to resist extremely severe conditions in the process of production and performance of porous concrete. The curing in autoclaves which is one of the most fundamental operations of the production process is performed in water-vapour environment in the fresh porous concrete. Thermal stability /1,2/ is one of the basic criteria for determination of a particularly suitable type of protective coating system.

Styrene-acrylate and polyacrylate binder-based dispersion coatings which can be thinned with water are currently used for steel reinforcement protection in porous concrete in our country. The binder content constitutes about 25 percent of total solids.

The state testing authority No 227 worked out a testing method and determined criteria for the thermal stability evaluation of dispersion coatings at the order of The Research Institute of Civil Engineering Prague, branch-office Brno.

The principle of the dispersion thermal stability definition is based on determination of weight losses of samples at 200°C and 250°C. They are read off the TG curve plotted on the MOM Budapest Derivatograph according to a defined programme /2/.

The testing sample is prepared as follows: a homogenized drop of dispersion is uniformly applied on the interior surface of a a corundum crucible, allowed to dry first at the room temperature and then in the drying oven at 60°C. The process is repeated until the final weight of cca 200 mg is reached.

The sample is then desiccated at 100°C to get a constant weight and after cooling in the desiccator it is prepared for the thermal analysis.

The thermal analysis is carried out in the following working conditions:

Weight of sample	190 - 220 mg
Heating time	400 min
Atmosphere	statical
Temperature	500°C
Sensitivity DTA	1 : 5
Sensitivity DTG	1 : 15
Sensitivity TG	200

The weight losses at 200°C and 250°C are read off the Derivatograph. The evaluation of the dispersion quality in terms of thermal stability is made according to the following table:

Degree of quality	Weight losses at 200°C	Weight losses at 250°C
First-class quality	2 %	3 %
Second-class quality	2,5 %	4 %

CONCLUSIONS

The thermal stability evaluation of the dispersions designed for production of protective coatings in steel-reinforced porous concrete is performed according to the worked out method by evaluating TG curves from the Derivatograph plotted under defined conditions.

REFERENCES

1 J. Pavlovič, J. Krajči, E. Boubelová, K. Bartoň, On the problems of anticorrosive protection of steel reinforcement in the porous concrete, Stavivo 62, No 11 /1984/

2 The method for thermal stability determination of dispersion protective coatings of steel reinforcement in porous concrete, worked out by Výskumný a vývojový ústav Prefabrikácie, Bratislava 1983