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FAQ's – "Frequently Asked Questions" about the NextGen Epoxy™ Waterborne System (ER7520 with RSC-4431)

1. **What is the NextGen Epoxy™ Waterborne System?**
    a. This system is a ~500 WPE, solid epoxy resin dispersion called EPI-REZ™ Resin 7520-WD-52, when it is combined with Research Curing Agent RSC-4431, a solvent-free, water-reducible amine solution in water.

2. **Where are these products being manufactured and is there any stock available for field trials?**
    a. ER7520WD52 is produced in Europe but we are keeping drum stock in our US warehouse. As demand grows, we will consider moving to domestic (US) production in the future.
    b. Research Resin RSC-4431 is produced in the U.S. and there is stock in our main US warehouse.

3. **How did HEXION reduce the applied cost without sacrificing performance?**
    a. Primarily by focusing on the product design and optimization of our manufacturing guidelines
    b. Low amine loading (low equivalent weight of curative)
    To help customers more easily transition to WB epoxy technology, we have determined an attractive price positioning versus alternative WB epoxy resins and curing agents

4. **What is the price of the NextGen Epoxy™ Waterborne System?**
    a. Please discuss this question with your distributor or direct commercial account manager.
    b. The applied cost of this high performance system is more economical than other WB systems that we have benchmarked and closer to the applied cost of a SB epoxy/polyamide system
    c. Actual application costs and comparisons will vary depending on formulation

5. **What are the advantages of using a SER (Solid Epoxy Resin) dispersion versus an LER (Liquid Epoxy Resin) emulsion for civil engineering applications? (on concrete)**
    a. Waterborne solid epoxy resin dispersions offer faster dry, longer working pot life; as well as, excellent adhesion and gloss levels.

6. **Are there any health or toxicity issues or concerns with this new WB system?**
    a. Refer to SDS for details regarding the safe use and handling of these products.
    b. Compared to solvent-borne alternatives, this NextGen Epoxy™ Waterborne System is not flammable and contains water versus solvents such as toluene or methyl ethyl ketone.

7. **What are the suggested film thickness levels for this waterborne system?**
    a. For primer, 2-3 mils DFT depending on performance requirements
    b. For concrete, 3-4 mils for optimum hiding power (substrate type and profile dependent)

8. **What are the typical dry times for this new WB epoxy system**?
    a. Can be cured at ambient and elevated temperatures. Under certain conditions, the WB coatings may actually dry faster than SB epoxy. Under standard conditions (25C and 55% R.H.) these dry times are typically going to be through dry in 6-9 hours and cotton-free in 1-2 hours.

9. **Why is the NextGen Epoxy™ Waterborne System considered "easy to formulate**"? Some of the reasons are:
    a. Curing agent and resin: Easily disperse pigments into either material. Both resin and curing agent are shear stable. Due to low use level of curing agent, pigmenting the amine side should make it easier to achieve standard mixing ratios. Low oil absorption pigments are recommended to enable both higher solids and low viscosity.
    b. Curing agent and Epoxy Resin: Both have improved freeze-thaw resistance
    c. Epoxy resin is lower viscosity (1,000 – 6,000 cP) so it is easier to transfer from drums. It has superior product stability so the viscosity stays within specification for 12 months at recommended storage temperatures.
    d. Curing agent: Lower viscosity at higher solids compared to the typical commercial curing agents, easy to handle and reduce with water (up to a maximum of 1:1 by volume).
    e. Curing agent: Solvent-free (non-flammable, lower odor, able to add solvents of choice; as well as, to achieve ultra-low VOC content)

10. **How is the storage stability (shelf life) of these two products?** What are the recommended storage temperature conditions? Please refer to the Shelf life & Storage documents on our website: www.hexion.com/epoxy for full details but in summary:

    a. **Curing agent (RSC-4431)** has a minimum shelf life (no maximum) of two (2) years from date of certification at recommended storage conditions. The recommended storage conditions for this product is 75 ± 25ºF max., dry and free of contamination. Do not allow this product to freeze.
    b. **Epoxy resin dispersion (ER7520WD52)** has a minimum shelf life (no maximum) of one (1) year from date of certification at recommended storage conditions. The recommended storage conditions for this product is 75 ºF max., dry and free of contamination. Do not allow this product to freeze.
    c. In lab testing, both products have passed five freeze-thaw cycles (-5C to 25C) based on COA specification ranges. It is recommended that these products should be protected from freezing during shipping and storage.

11. **What are the recommended mix ratios – epoxy resin to curing agent? And what types of standard mix ratios are possible for the fully-formulated coatings?**
    a. The weight ratio of epoxy resin (ER7520WD52) to curing agent (RSC-4431) as supplied is approximately 8:1. One-to-one stoichiometry is 18-19 PHR of curing agent (solids) to every 100 parts of epoxy resin solids.
    b. For clears, the mix ratio of Part A component (formulated epoxy) to Part B (formulated curing agent) is going to be 3:1 (or 4:1) by volume.
    c. High gloss enamels can be formulated from 1:1 to 3:1 mix ratios and in primers either 1:1 or 2:1.

12. **What are the suitable application conditions for this system?**
    a. Suitable for application by spray, brush, roller. Recommended application and cure conditions are similar to that of other waterborne 2K systems.
        i. A range of ~ 40-80% R.H. levels at 50°-90° F is typical but each formulation should be evaluated to define the temperature and humidity window that allows the coating to meet the customers' requirements.

ii. Optimizing the co-solvent blend can potentially expand the application window depending on key requirements. For low humidity conditions, a slower coalescing solvent may be needed.

b. Good air flow and humidity control are highly-recommended for shop-based applications

13. What are the typical recoat times for this system?

a. Recoat windows will vary widely depending on application conditions, film thickness applied, method of application and pigment loading levels.
b. When top coating with other resin types, the WB epoxy coating formulation will impact the recoat times. If faster co-solvents are used or if the system is accelerated then the recoat times can be potentially be decreased. In general, it is suggested to recoat after overnight cure. In an OEM application line, after a 5-10 minutes of flash-off time, then force dry (with controlled humidity) to enable faster recoat times.
c. For shop primers, a WB epoxy primer may have an extended recoat window versus a SB epoxy / polyamide primer. Instead of a max recoat window of 2-4 weeks, some WB shop primers may allow recoat intervals of several months (depending on the type of topcoat).

14. What are the guidelines for surface preparation and are there any issues that customers need to consider?

a. Evaluations and testing are in progress. The quality of surface preparation is a critical variable for long-term performance. For either concrete or metal surfaces, shot-blasting is recommended.

15. What are the guidelines regarding safe handling and waste disposal of these materials?

a. Refer to the Safety Data Sheet (SDS) for guidelines on safe handling of these specific products.
b. Refer to the "Facilities for Storage and Handling of EPON™ Resins, EPON™ Resin Solutions and EPONOL™ Resins" (Safe Handling Guide), (HXN-178) and "Workplace Guide to Handling Epoxy Resins and Curing Agents" (Safe Handling Guidelines), (HXN-177) for additional information about safe handling of epoxy and related components.
c. Consult all local, state and federal regulations regarding waste disposal regulations.

16. Is there a visible end of pot life? How do I determine when I should stop applying formulations based on this new WB epoxy system?

a. Visible end of pot-life may be formulation dependent. It can be achieved by adjusting variables such as solids content, increasing reactivity or adjusting formulation components. The application pot life of each formulation should be evaluated to determine the specific working time at a given temperature and mixed quantity.
b. With formulations that do not increase viscosity over time, the application window should be determined based on performance requirements. Typically, when the end of pot life is reached, the gloss, pencil hardness or MEK resistance will decrease noticeably. Resin and curing agent continue to react during the pot life, therefore, film coalescence may be negatively affected resulting in poor coating performance. Longer-term testing of salt spray, humidity and chemical resistance can be used as validation.