A “How-to” Guide to the Use of ACTIV-8® Drier, Stabilizer and Accelerator

ACTIV-8® Drier, Stabilizer and Accelerator is a 38% solution of 1,10-Phenanthroline, a chelating agent. When used with cobalt or manganese driers, ACTIV-8 accelerates and stabilizes the drying rates of solvent-borne and waterborne coatings that cure by oxidative polymerization.

To determine the optimum amount of driers and ACTIV-8, surface dry, through dry, and hard dry must be balanced. This can be achieved by a mixture of cobalt and/or manganese plus ACTIV-8. The amount of ACTIV-8 required is based only on the amounts of cobalt and/or manganese metal. The auxiliary driers are not affected by ACTIV-8. A general rule is that manganese/ACTIV-8 provides the best surface dry while cobalt/ACTIV-8 provides the best hard dry.

NOTE: ACTIV-8 should not be used in a coating containing zinc drier or zinc oxide as an undesirable white compound will form that does not aid in drying. ACTIV-8 should not be used with iron driers, since ACTIV-8 plus iron produces a strong pink discoloration.

Determining the Amount of ACTIV-8 to Use

It is very important to accurately determine the amount of driers and ACTIV-8 to be used in a given coating. The three step procedure used to determine the amount of ACTIV-8 required is as follows:

STEP 1: Determine the amount of resin solids in the coating formula

Example: For 195 lb. of alkyd resin solution containing 90% non-volatile solids, determine the amount of resin solids.

\[
\text{amount of resin} \times \text{percent non-volatile solids} / 100 = \text{resin solids} \\
195 \text{ lb.} \times 90 / 100 = 175 \text{ lb. resin solids}
\]

STEP 2: Determine the amount of metallic drier to be used

Driers are supplied as solutions of metallic salts of long chain organic acids in various solvents. Their concentrations are expressed as % metal. Recommended amounts of driers for typical air dry coatings based on resin solids are:

- Cobalt 0.02 - 0.05%
- Manganese 0.02 - 0.06%

Example: For the 175 lb. of resin solids in STEP 1, determine the amount of a 12% cobalt solution that is needed to achieve 0.05% cobalt metal based on resin solids.

\[
\text{amount of resin solids} \times \text{percent metal} / 100 = \text{amount of cobalt metal} \\
175 \text{ lb. resin solids} \times 0.05 / 100 = 0.0875 \text{ lb. cobalt metal}
\]
STEP 3: Determine the amount of ACTIV-8® Drier, Stabilizer and Accelerator to use

For solvent-borne alkyds, ACTIV-8 is used at a ratio of 10 parts ACTIV-8 (as received) to 1 part cobalt metal. For water-reducible alkyds, a ratio of 5:1 is recommended.

Example: Given that there is 0.0875 lb. of cobalt metal, determine the amount of ACTIV-8 to use.

\[
\text{amount of metal} \times 10 = \text{amount ACTIV-8} \\
0.0875 \text{ lb.} \times 10 = 0.875 \text{ lb. ACTIV-8}
\]

Next, prepare a series of paints at various drier concentrations and then run dry time testing. Consult your resin supplier for starting formulas and drier recommendations with regard to the resin.

Suggested Formulas for Drier plus ACTIV-8® Drier, Stabilizer and Accelerator Pre-Blends

Drier efficiency, resistance to loss of dry on aging, and resistance to yellowing can be improved by pre-blending the driers and ACTIV-8 in a suitable solvent and letting the pre-blend age at least 1 hour prior to addition to the coating. Two formulas for drier plus ACTIV-8 pre-blends follow.

1. For coatings based on alkyd binders in organic solvent

<table>
<thead>
<tr>
<th>Component</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Butanol</td>
<td>32.7</td>
</tr>
<tr>
<td>Xylene</td>
<td>32.6</td>
</tr>
<tr>
<td>ACTIV-8</td>
<td>13.0</td>
</tr>
<tr>
<td>6% Mn Solution (1.3% Mn metal)</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Add ACTIV-8 and Mn solution to solvent, age at least 1 hour.

2. For coatings based on emulsions or water-reducible alkyd binders

<table>
<thead>
<tr>
<th>Component</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexylene glycol</td>
<td>68.0</td>
</tr>
<tr>
<td>ACTIV-8 HGL</td>
<td>12.0</td>
</tr>
<tr>
<td>6% Co Solution (1.2% Co metal)</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Add ACTIV-8 and Co solution to solvent, age at least 1 hour.

For more information on the use of ACTIV-8, including technical data and formularies, go to www.vanderbiltminerals.com.

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