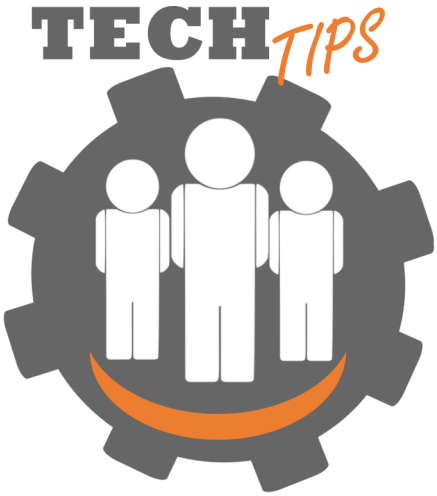
Spalling of Primary Shell Coats



Spalling is not always caused by the primary coat, as often believed. A variety of factors can cause spalling. Six of the most common causes and potential solutions include the following:

Cause: Fines in Stucco

If the primary stucco contains a high level of fines (dust), it will dust over the slurry coat, keeping the actual stucco from coating the shell properly. The next slurry layer will not adhere well to this fine particle surface. Weak adhesion between layers will result in delamination and spalling.

Solution

Dedust the stucco using a dust collector. See if the stucco has been degraded by mechanical means, such as bucket elevators in the rainfall sander or friction in fluid beds. Change the stucco, if necessary.

Cause: Improper Draining

Slurries need to be applied in an even, uniform coat. When the slurry viscosity is too high or the tree is not drained properly, heavy layers of slurry are left behind. These heavy areas do not dry properly and leave a soft, poorly cured moisture pocket behind. When the part is autoclaved, this moisture tries to escape and causes the primary coats to pop off. This condition normally occurs on the second prime.

Solution

Drain the slurry away from areas where it may pool. If necessary, use a prewet (see page 2 for caution) or, if possible, use a second primary slurry with a lower viscosity.

Cause: Poor Slurry Control

High binder solids in the primary slurry will inhibit drying, causing the slurry to dry on the surface and entrap moisture underneath. This moisture will try to migrate out too fast during autoclaving and cause spalling.

Solution

Institute a slurry control program. R&R can provide information regarding the necessary testing procedures, if needed. If you currently have a program, increase the frequency or have a sample checked by the R&R Technical Department to test the accuracy of your results.

Cause: Excess Prewet

Prewetting is used to stop the previous shell layers from absorbing excess binder from the slurry. The shell will shine after the prewet drains off. Excess prewet can also be washed into an area by the next slurry layer causing a liquid pocket. This pocket becomes a void when the binder evaporates, leaving a weak area. Spalling and delamination can occur in this area.

Solution

Drain the prewet away from pockets and out of detail. When the prewet is properly drained, the shell will take on a dull or matte finish.

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Cause: Excess Stucco Buildup

Sometimes the primary stuccos will build up too heavily, that is, a given stucco coat has too many layers of grain for that individual coat. This happens because they are fine and light and require very little slurry contact to stick. If this excess stucco is not removed, the next slurry coat cannot penetrate the stucco properly and causes a weak bond between layers, which leads to spalling. As a result, one way to reduce this spalling is to blow off excess stucco between primary coats.

Solution

Use a low pressure air hose or wand to remove excess stucco. Manipulation of the part may be inadequate to remove loose stucco.

Cause: Poor Bond Between Primary and Backup Slurries

For a combination of the above reasons, the first backup slurry coat does not bond to the primary coat.

Solution

If you have checked the above conditions and are unable to resolve spalling completely, try using coarser stucco on the second or final primary slurry coat. This will leave a rougher surface to which the first backup coat can bond.

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