Autoclave Abort Handling

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| **Purpose** | This procedure provides instructions on how to handle aborted batches, batches that end early and batches that have a quality violation.  The attached document contains:  1) the decision tree on how to handle batches:   * normal batches, * aborted batches, * batches that end early * batches in violation of a QSOC * batches that have a nonstandard RDPS   2) Guidance for when to abort  3) Guidance for abort follow up |

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Autoclave Abort Handling, Continued

Did Batch end early?

No

Abort prior to kickoff?

Drop abort to RWDC

* Push maximum heel over for product
* Drop abort to Decanter
* WTI Decanter contents
* Troubleshoot issue and write QVR

Yes

Yes

Run out as segregated FPD material

* Push maximum Decanter heel over for product
* Drop abort to Decanter
* Decant wax
* Notify Dryers to empty a BT to accept 2nd quality batch
* Notify Dryers and Packout to run this material as 2nd quality.
* Transfer batch to BT
* WTI Decanter heel and clean\*
* Troubleshoot issue and write QVR

Yes

Abort before ZnCl2 transfer target

Yes

Are these normal?

* Reaction time
* RDPS
* Reaction profile

Run out as segregated batch

* Drop abort to Decanter
* Notify Dryers to empty a BT to accept segregated batch
* Notify Dryers and Packout to run as segregated lot.
* Transfer batch to BT
* Troubleshoot issue.
* Write QVR. List action to make the final lot UD44

Yes

No

Abort before 1800 lbs ZnCl2 transfer (Can finish above ~18% solids)

Abort 70 lbs before ZnCl2 transfer target

Yes

No

No

No

See Next Page

**A**

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Autoclave Abort Handling, Continued

Batch complete:

1) RDPS standard?

2) QSOCs normal (Reaction time, KO time, etc.)?

Process Batch as 1st Quality

Yes

Is the RDPS standard?

Did a QSOC violation occur?

Yes

Yes

Run out as segregated FPD material

* Push maximum Decanter heel over for product
* Drop abort to Decanter
* Decant wax
* Notify Dryers to empty a BT to accept 2nd quality batch
* Notify Dryers and Packout to run this material as 2nd quality.
* Transfer batch to BT
* WTI Decanter heel and clean\*
* Troubleshoot issue and write QVR

An issue is occurring (not QSOC or RDPS) that operator is concerned about. Notify FLS and contact Technical.

Is the RDPS retest nonstandard?

Check that:

* surfactant went in normally,
* reaction profile is normal, and
* injection tank profiles are normal
* Write QVR
* Process Batch as 1st Quality

No

No

No

* Resample the Decanter and test the RDPS

or

* Cross check the result at the lab

No

Yes

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\* During Decanter cleaning, ensure no Solids end up in the Sump / floor drains. All Solids are to be drummed.

End of Topic

When to Abort

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| **When to Abort** | These items are design to help the operator decide when to abort a batch. |

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| Long Kickoff | If polymerization fails to kick-off within the specified time (Manual 33P Section 4.C):   * Abort the batch. |

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| Agitator Stop | If the agitator stops:   * attempt to restart * monitor amps after restart * evaluate for high amps causing interlock   If the agitator will not continue to run   * abort the batch * notify supervision * inspect the agitator system and * contact technical if needed   Loss of agitation will cause the reaction to stop. |

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| Abnormal Reaction Rate | If the reaction rate is slow:   * evaluate if batch is going to exceed the QSOC for reaction time * Monitor amps and run to level that Dryer can process (see flow diagram above) * If amps are high, abort.   If the reaction rate is high:   * monitor autoclave temperature and * watch for high temperature and abort if needed. * monitor monomer weigh tank pressure and * watch for out of control pressure and abort if needed   If the reaction rate is not proceeding normally:   * abort the batch. |

End of Topic

Abort Follow Up

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| Abort Follow Up | These items are design to help the operator follow up to an abort. |

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| Follow Up to High ZnCl2 to Pressure Abort | If “ZnCl2 to pressure-up” falls outside the SOC range (Manual 33P Section 4.C), the DCS will abort the batch. This condition indicates:   * a short aqueous charge * partial loss of the aqueous charge. * loss of TFE to pressurize system   Check:   * TFE analyzer levels * Emergency MWT and Autoclave vents * Signs of wax leaking from the Autoclave indicative of a leak * amount of water charged on the batch end report and IP21 versus setpoint * amount of water charged on the batch end report and IP21 versus aqueous charge tank level |

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| Follow Up to HiHi MWT Weight Abort | If an abort occurs due to HiHi MWT Weight then this condition indicates issues with the TFE/ZnCl2 inventory at the beginning of the batch or issues with the MWT weight.  Check:   * Inventory of the ZnCl2 system according to 33P4G2 * Check to see if the TFE feed valve was leaking through and resulted in pressure control issues in the autoclave and if this prevented the TFE block valve from closing at the normal time. The TFE feed and block valve may need to be replaced (see OD 33P4F3 for changing the TFE feed and block valves) * Check for excessive ice on the MWT and if found, melt the ice * If nothing is found then the MWT may need to be vented and the weigh scales checked |

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Abort Follow Up, Continued

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| Follow Up to High Temperature Abort | Monitor autoclave temperature.   * If it reaches 105°C abort the batch, or * batch logic should abort on high temperature. * Notify supervision of the event.   Check the following   * Jacket water system is controlling properly * Full cooling water is on the autoclave and agitator. * Ram-cleaning system is working properly. * Thermowells, inboard and outboard are clean   High temperature causes an increase in reaction rate, which in turn generates more heat. The uncontrolled generation of heat can lead to a decomposition in the Autoclave and activation of the rupture discs. |

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| Follow Up to Sudden Drop in Autoclave Pressure | Monitor Autoclave pressure.   * If it drops suddenly abort the batch, or * batch logic is designed to automatically abort on pressure drop   A sudden drop in autoclave pressure is usually caused by:   * activation of an autoclave rupture disc or * failure of the clave head gasket. |

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| Follow Up to High Autoclave Pressure | Monitor Autoclave pressure.   * If it reaches 440 psig, abort the batch, or * batch logic should abort on high pressure   High reactor pressure causes an increase in reaction rate, which in turn generates more heat and pressure. The uncontrolled generation of heat can lead to a decomposition in the Autoclave and activation of the rupture discs. |

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| Follow Up to High Agitator Amps or Agitator Stop (Won’t Restart) | This type of abort may be the result of a setup batch or excessive coagulum formation. Carefully compare the amount of material removed from the autoclave during batch drop to the amount of polymer produced when the abort occurred. Contact technical if help is required in this evaluation.  If the agitator will not run due to high amps or more than 20% of the batch remains in the autoclave, do not proceed to ram cleaning. Instead lock-out the autoclave for opening and high pressure water cleaning. |

End of Topic