



THERMAL PROCESSING
TRAINING

Module 4: Canning Regulations— An Overview

Thermal Processing for Meat and Poultry
Products Training



Purpose and Objectives



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- **Purpose of Module 4**
 - Provide an understanding of key sections of FSIS canning regulations
- **Performance Objectives**
 - Become familiar with main sections of regulations
 - Familiarization with and effective use of current FSIS Directive 7530.2



Subpart G - Canning and Canned Products



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- Regulations for canning and canned products are contained in:
 - 9 CFR 431.1 through 431.12



§431.1 - Definitions



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- **Canned Product:** meat or poultry product with water activity >0.85 which receives a thermal process either before or packaging in hermetically sealed container
- **Thermal Process:** Heat treatment necessary to achieve shelf stability as determined by Processing Authority
- **Abnormal Container:** Container with any sign of swelling, product leakage, or any evidence that contents of unopened container may be spoiled



Definitions (con't.)



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- **Initial Temperature (I.T.):** measured in coldest container at start of thermal process
- **Process Temperature (PT):** minimum maintained temperature of heating medium
- **Process Time (B_b):** intended time containers exposed to heating medium in retort while at or above PT
- **Come-up Time (CUT):** elapsed time in minutes at start of B_b until retort reaches required PT



Examinations of Empty Containers and Closures



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- **§431.2 Examination and Cleaning of Empty Containers**
 - Closure examinations for rigid containers (cans)
 - Visual examinations
 - Teardown examinations
 - Closure examinations for glass containers
 - Visual examination
 - Closure examination and tests



Examinations of Empty Containers and Closures (con't.)



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- Closure examinations for semirigid and flexible containers
 - Visual examination
 - Physical tests
- Container coding
- Handling of containers after closure



Thermal Processing



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- **§431.3 Thermal Processing**
 - Process Schedules (PS)
 - Developed by a Processing Authority (PA)
 - Source of process schedules
 - Submittal of process information
 - Any changes to PS evaluated by PA



Critical Factors



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- **§431.4 Critical Factors**
 - Container orientation
 - Product formulation
 - Maximum thickness of flexible containers
 - Retort reel speeds



Operations in the Thermal Processing Room



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- **§431.5 Operations in the Thermal Processing Room**
 - Posting of processes
 - Process indicators and traffic control
 - Initial temperatures
 - Timing devices
 - Measurement of pH



Equipment and Procedures for Heat Processing Systems



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- **§431.6 Equipment and Procedures for Heat Processing Systems**
 - Instruments and controls common to different systems
 - Indicating temperature devices
 - Mercury-in-glass thermometers
 - Other devices
 - Temperature recording devices
 - Chart-type devices
 - Steam controllers
 - Air valves/water valves



Equipment and Procedures for Heat Processing Systems (*con't.*)



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- Instruments and controls common to different systems (*con't.*)
 - Pressure processing in steam
 - Batch still retorts
 - » Recommended venting schedules
 - Batch agitating retorts
 - Continuous rotary retorts
 - Hydrostatic retorts



Equipment and Procedures for Heat Processing Systems (con't.)



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- Pressure processing in water
 - Batch still retorts
 - Batch agitating retorts
- Pressure processing in steam-air mixtures
- Atmospheric cookers (batch, continuous)
- Other systems
- Equipment maintenance
- Container cooling and cooling water
- Post-process container handling



Processing and Production Records



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- **§431.7 Processing and Production Records**
 - Processing in steam
 - Batch still retorts
 - Batch agitating
 - Continuous rotary
 - Hydrostatic retorts



Processing and Production Records (*con't.*)



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- Processing in water
 - Batch still retorts
 - Batch agitating
- Processing in steam-air mixtures
- Processing in other systems (e.g., cascade or water spray)
- Atmospheric cookers (batch, continuous)



Record Review and Maintenance



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- **§431.8 Record Review and Maintenance**
 - Process records
 - Automated process monitoring and recordkeeping
 - Container closure records
 - Distribution of product
 - Retention of records



Deviations in Processing



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- **§431.9 Deviations in Processing**
 - HACCP plan that addresses microbial hazards
 - Procedures for handling deviations if microbial hazards occur
 - Deviations identified in-process
 - Deviations identified through record review



Finished Product Inspection



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- **§431.10 Finished Product Inspection**
 - Incubation of shelf stable canned product (if applicable)
 - Incubator
 - Incubation temperature
 - Product requiring incubation
 - Incubation samples
 - Incubation time



Finished Product Inspection (con't.)



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- Incubation checks and records
- Abnormal containers
- Shipping
- Container condition
 - Normal containers
 - Abnormal containers



Additional Parts



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- **§431.11 Personnel and Training**
- **§431.12 Recall Procedure**





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Verification Activities in Canning Operations That Choose to Follow the Canning Regulations



FSIS Directive 7530.2 (con't.)



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- If the establishment elects not to address hazards associated with microbiological contamination in its HACCP plan, the decision is the hazard is NRLTO
- Any records required by regulations in 9 CFR 431 and establishment's associated process documentation would be required to be kept under 9 CFR 417.5(a)(1)



HACCP Verification Task



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- Select specific production
- Use RK, RO, or both components
- Verify monitoring, corrective action, verification, and recordkeeping requirements at all CCPs (if any) and execution of any prerequisite programs
- Verify canning regulations relevant to the specific production (see Dir. 7530.2, IV)
- Verify 1 or more other canning regulations



HACCP Verification Task (*con't.*)



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Verify that:

- Process schedule posted
- Correct process schedule used
- No formulation, equipment, or treatment changes
- I.T. measured and recorded
- All critical factors met
- Deviations appropriately handled



HACCP Verification Task (con't.)



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Verify that:

- Required processing information recorded
- Only normal containers selected for incubation (if applicable)
- Establishment reviewed all processing and production records no later than one working day after actual process
- §417.5(a)(3) requirements met if HACCP plan addresses any chemical or physical hazards



Corrective Actions



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- If microbial hazards are addressed with canning regulations, corrective actions must meet per §431.9
- If a deviation is not handled according to §431.9, it is a regulatory noncompliance
- Unforeseen hazards must be addressed according to §417.3(b)
- If chemical or physical hazards are addressed as CCPs, corrective actions for deviations from critical limits must meet §417.3(a)



Corrective Actions (con't.)



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- If inspection personnel have concerns about the establishment's corrective actions, they should contact their supervisor and request assistance.



Documentation



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- Noncompliance with Part 431 canning regulations should be addressed by issuance of Noncompliance Record (NRs) and/or retention of suspect product
- When an establishment addresses microbiological hazards using the canning regulations, IPP document noncompliance with applicable canning regulation and also §417.5(a)(1)



Key Points



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- **Must** = requirement
- **Should** = recommendation
- Part 431 sections include definitions and address requirements for:
 - Containers and closures
 - Thermal processing
 - Critical factors
 - Operations in the thermal processing area



Key Points (con't.)



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- Part 431 also addresses requirements for:
 - Equipment and procedures for heat processing systems
 - Processing and production records
 - Record review and maintenance
 - Deviations in processing
 - Finish product inspection
 - Personnel and training
 - Recall procedures



Key Points (con't.)



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- IPP must ensure that their assigned facility complies with applicable sections of regulations
- Design and application of recommended thermal process is critical to finished product safety
- Installation, operation, instrumentation, maintenance, and validation of thermal processing systems is critical to finished product safety



Key Points (con't.)



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- Proper handling of thermal process deviations and affected product is critical to finished product safety
- Proper handling of abnormal containers (e.g., swollen, leaking, evidence of spoilage), whether in incubation or found elsewhere, is critically important



Key Points (con't.)



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- When performing HACCP Verification tasks for specific production of canned foods, IPP verify HACCP plan implementation (Directive 5000.1) **AND**
- Verify compliance with canning regulations relevant to specific production and one or more general canning regulations (Directive 7530.2)





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Questions?

