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TECHNICAL INTELLIGENCE BRIEF

MEAT, POULTRY & RENDERING EDITION

YIELD • RECOVERY • WATER •
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Prepared by



EterSolis

Waste & Carbon Management

TECHNICAL INTELLIGENCE BRIEF

MEAT, POULTRY & RENDERING INDUSTRY EDITION

Processing operations, environmental systems and resource-performance intelligence

PROCESSING UTILITIES • ODOUR CONTROL •
AIR EMISSIONS • WASTEWATER SYSTEMS •
RENDERING OPERATIONS • RESOURCE RECOVERY •
FOOD SAFETY & HYGIENE • OPERATIONAL EFFICIENCY



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OCTOBER 2026 RELEASE
CLEAN ENERGY FOR A MORE
RESOURCE EFFICIENT INDUSTRY

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EterSolis
Waste & Carbon Management

Publication control and complete-series boundary

CEPA-CL-MEAT002-P01

KEY

Issue 002 converts MEAT-001's single odour/air overview into a source-capture-treatment-monitoring system without repeating retained water, refrigeration, yield or general recovery intelligence.

TECHNICAL BASIS

MEAT-001 established the broad facility operating model and included one odour/air page. The new issue is justified only by deeper source-specific engineering: where emissions form, whether they are captured, how the gas is conditioned/treated, how performance is measured and how bypass/cross-media impacts are controlled.

DECISION INTERPRETATION

Readers should not interpret odour complaints, one concentration result or one control device as a complete emissions-management system.

CONTROL ACTION

Adopt one source register linking process, gas stream, capture, treatment, monitoring and responsible owner.

REQUIRED RECORDS

Source ID; process; operating state; enclosure/capture; gas conditions; monitoring; control device; bypass/downtime; residuals.

AUDIT / ESCALATION TRIGGER

Escalate any material source that lacks a defined capture/treatment/monitoring status.

Sources: M2-EV-001..002; MEAT-001 continuity | Claim: CEPA-CL-MEAT002-P01

Executive findings: source capture before complaint response

CEPA-CL-MEAT002-P02

KEY

Odour and related air emissions are controlled most reliably by preventing formation where practical, capturing emissions close to source, selecting treatment for the actual gas stream, and verifying control performance over time.

TECHNICAL BASIS

EU Decision 2023/2749 provides a current BAT framework for slaughterhouses and animal by-product industries. It includes source-near extraction/enclosure concepts and, for relevant rendering/fat-melting/blood/feather processes, BAT 25 treatment techniques for organic and malodorous compounds including H₂S and NH₃.

DECISION INTERPRETATION

Community complaints can help identify events, but they do not replace source inventories, standardised monitoring, flow/load information or control-device reliability data.

CONTROL ACTION

Create an air/odour control plan organized by source rather than by complaint category.

REQUIRED RECORDS

Source map; capture design; gas flow/composition; BAT/permit applicability; treatment operating data; maintenance; monitoring; incidents/complaints.

AUDIT / ESCALATION TRIGGER

Escalate a program that closes odour issues solely by complaint count falling without verifying source/control performance.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P02

Air and odour system boundary

CEPA-CL-MEAT002-P03

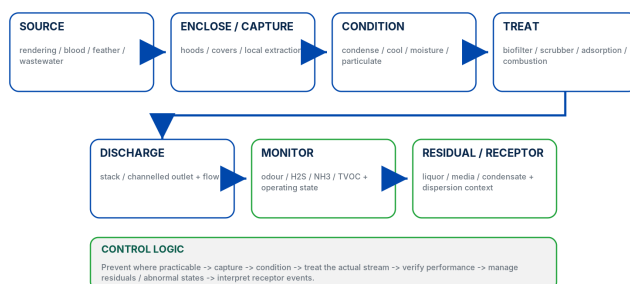
KEY

A decision-grade air/odour inventory begins at process generation and ends only after capture, treatment, discharge and residual management are reconciled.

Air / Odour Control Boundary

Control begins at source formation and ends after residual management and receptor context.

M2-V01



Sources: Decision (EU) 2023/2749 BAT 18/25 + current monitoring/corrigendum; CEPA source-to-receptor control model. No technology ranking or universal limit is implied.

M2-V01_Air_Odour_Control_Boundary | Conceptual framework; no facility performance implied.

TECHNICAL BASIS

Relevant boundaries can include slaughter areas, raw-material reception/storage, rendering/fat melting, blood/feather processing, wastewater equalisation/DAF/biological treatment, sludge/solids handling and storage. The same compound may move between liquid, solid and gas phases; treatment can also create wastewater, condensate or spent media.

DECISION INTERPRETATION

Map source -> capture -> duct/conditioning -> treatment -> stack/discharge -> residuals. This distinguishes source reduction from transfer and makes untreated bypass visible.

CONTROL ACTION

Assign one ID to each material source and each treatment train.

REQUIRED RECORDS

Process source; gas collection point; air flow; temperature/moisture; pollutant/odour data; treatment; residual destination; operating schedule.

AUDIT / ESCALATION TRIGGER

Escalate sources that share ductwork/treatment but cannot be distinguished during upset diagnosis.

Sources: M2-EV-001; M2-EV-002 | Claim: CEPA-CL-MEAT002-P03

Odour source inventory

CEPA-CL-MEAT002-P04

KEY

Odour control starts with a process-specific source inventory because emission character and intermittency differ across raw material, rendering, blood/feather and wastewater operations.

TECHNICAL BASIS

EU BAT monitoring tables distinguish processes and parameters, including rendering/fat melting/blood/feather activities. Source properties can change with material freshness, temperature, residence time, moisture, biological activity and process upsets. A generic plant-average odour concentration cannot identify which source should be controlled first.

DECISION INTERPRETATION

Prioritize sources using evidence on frequency, flow, concentration/load, capture status, proximity to receptors and controllability; do not use complaint frequency as the only ranking variable.

CONTROL ACTION

Build source cards for every material continuous and intermittent source.

REQUIRED RECORDS

Source location; process state; hours; materials; temperature; air flow; compounds/odour; capture status; complaint/event linkage.

AUDIT / ESCALATION TRIGGER

Escalate intermittent upset sources excluded from normal-state monitoring.

Sources: M2-EV-001; M2-EV-002 | Claim: CEPA-CL-MEAT002-P04

Channelled versus diffuse/fugitive emissions

CEPA-CL-MEAT002-P05

KEY

Whether emissions are captured into a defined duct/stack determines what can be monitored and controlled; uncaptured diffuse releases require source/capture improvements rather than stack-only optimization.

TECHNICAL BASIS

A channelled emission passes through a defined outlet after capture/ducting. Diffuse/fugitive releases can escape from open processing, doors, buildings, tanks or poorly captured equipment. EU BAT distinguishes channelled monitoring and also uses enclosure/extraction approaches for odour-generating operations.

DECISION INTERPRETATION

Report capture status separately from treatment efficiency. A high-performing control device cannot reduce emissions that never reach it.

CONTROL ACTION

Measure or otherwise verify capture coverage and identify bypass paths.

REQUIRED RECORDS

Source list; enclosure status; hood/extraction design; airflow/pressure checks; door/vent conditions; duct connections; stack sources.

AUDIT / ESCALATION TRIGGER

Escalate treatment-efficiency claims when capture efficiency or bypass is unknown.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P05

Rendering and fat-melting gas sources

CEPA-CL-MEAT002-P06

KEY

Rendering air control must recognize the difference between condensable vapour, non-condensable odorous gases, process ventilation and room/source capture.

TECHNICAL BASIS

EPA AP-42 Section 9.5.3 describes meat-rendering processes and historical emissions-factor context, while current EU BAT 25 addresses defined rendering/fat-melting air emissions using a suite of controls. AP-42's public section dates to 1995 and is technical background, not current legal authority.

DECISION INTERPRETATION

Use AP-42 to understand source categories and legacy factor methods, but base current regulatory conclusions on applicable law/permit/BAT sources. Site measurement outranks a generic historical factor for control verification.

CONTROL ACTION

Map gas streams by source and physical character before selecting treatment.

REQUIRED RECORDS

Cooker/dryer/press/storage source;
vapour/non-condensable flow;
temperature/moisture; capture; treatment;
actual monitoring; AP-42 use rationale.

AUDIT / ESCALATION TRIGGER

Escalate use of a 1995 AP-42 factor as a universal current plant-emission value.

Sources: M2-EV-001, M2-EV-002 | Claim: CEPA-CL-MEAT002-P06

Blood and feather processing

CEPA-CL-MEAT002-P07

KEY

Blood and feather processing require dedicated source characterization because gas composition, moisture and operating cycles can differ materially from general rendering ventilation.

TECHNICAL BASIS

EU Decision 2023/2749 explicitly includes rendering, fat melting, blood and/or feather processing in the monitoring/BAT-AEL scope for parameters such as H₂S, NH₃, TVOC and odour under stated conditions. This justifies source-level treatment rather than assuming one plant-wide odour profile.

DECISION INTERPRETATION

Segment monitoring and control by process. Combined treatment may still be appropriate, but the source contribution must remain traceable for troubleshooting and compliance interpretation.

CONTROL ACTION

Assign separate source IDs and operating-state tags to blood and feather operations.

REQUIRED RECORDS

Throughput; source airflow; operating cycle; H₂S/NH₃/TVOC/odour where applicable; capture; treatment; incidents.

AUDIT / ESCALATION TRIGGER

Escalate combined-stack results that cannot be traced back to a failing source/process when performance deteriorates.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P07

Wastewater and sludge interfaces

CEPA-CL-MEAT002-P08

KEY

Wastewater systems can become major odour sources when high-load material is retained, turns anaerobic or is aggressively agitated without adequate capture/control.

TECHNICAL BASIS

Equalisation, DAF, sludge storage, anaerobic treatment and other interfaces can release reduced sulfur compounds, ammonia and organic odours depending on loading and conditions. The air-control issue is not a repeat of wastewater treatment design: it asks whether relevant emission points are prevented, covered/captured and integrated into the treatment train.

DECISION INTERPRETATION

Treat liquid-source control and air capture as linked. Preventing excessive product/by-product loss upstream can reduce odour formation, but this issue does not recreate MEAT-001's material-recovery framework.

CONTROL ACTION

Add wastewater/solids sources to the same air/odour source register.

REQUIRED RECORDS

Tank/DAF/sludge source; covers; extraction; pH/ORP or process indicators where relevant; loading; gas data; treatment; bypass.

AUDIT / ESCALATION TRIGGER

Escalate recurring odour events correlated with wastewater process upsets but absent from the air-control plan.

Sources: M2-EV-001; MEAT-001 continuity | Claim: CEPA-CL-MEAT002-P08

Enclosure and local extraction

CEPA-CL-MEAT002-P09

KEY

Capture performance should be designed around the source geometry and operating disturbance; treating room air after uncontrolled dispersion is generally a weaker first control than capturing near generation where practicable.

TECHNICAL BASIS

EU BAT describes air extraction as close as possible to the point of odour generation with full or partial enclosure, with extracted air potentially sent to treatment. Effective capture depends on openings, negative pressure/air balance, cross-drafts, access requirements and maintenance.

DECISION INTERPRETATION

A source may be "connected to ducting" yet poorly captured. Verification therefore needs airflow/pressure or smoke/containment evidence appropriate to the source, plus operating checks for doors/hoods/covers.

CONTROL ACTION

Define capture acceptance criteria for every priority source.

REQUIRED RECORDS

Hood/enclosure geometry; airflow; pressure; door/opening state; extraction alarms; balancing data; maintenance; treatment connection.

AUDIT / ESCALATION TRIGGER

Escalate persistent room/building odour where stack controls pass but source capture has not been verified.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P09

Odour concentration and measurement

CEPA-CL-MEAT002-P10

KEY

Odour concentration is a method-defined sensory measurement and must be interpreted with sampling location, gas flow and operating state; it must not be substituted for measured H₂S, NH₃ or TVOC when evaluating those compounds.

TECHNICAL BASIS

Current EU BAT identifies odour concentration as a separate monitored parameter, references EN 13725 where applicable, and separately lists H₂S, NH₃ and TVOC for relevant rendering/fat/blood/feather sources. This separation is the evidence basis for keeping sensory odour measurement distinct from chemical concentration data.

DECISION INTERPRETATION

Use odour concentration for the decision it supports: source/control comparison, BAT/permit evaluation where applicable, and event diagnosis. Pair with flow when emission rate is required.

CONTROL ACTION

Create an odour sampling plan tied to representative operating states and keep chemical analyte monitoring in its own parameter record.

REQUIRED RECORDS

Sampling point; method/lab; operating state; flow; temperature/moisture; replicate/QA data; treatment status; simultaneous pollutant data where relevant.

AUDIT / ESCALATION TRIGGER

Escalate odour results reported without units/method, source state or explanation of what the value means.

Sources: M2-EV-003; CEPA interpretation | Claim: CEPA-CL-MEAT002-P10

H2S, NH3 and TVOC monitoring

CEPA-CL-MEAT002-P11

KEY

H2S, NH3, TVOC and odour are different measurement objects; one should not be used as a universal proxy for another.

TECHNICAL BASIS

EU BAT identifies substance-specific monitoring methods/frequencies for defined rendering and related activities and Table 1.10 provides parameter-specific BAT-AELs. H2S may be significant in reduced sulfur conditions, NH3 in nitrogenous material/processes, and TVOC represents a different aggregate chemical measure.

DECISION INTERPRETATION

Build a parameter-source hypothesis before sampling. Monitoring everything everywhere is not expert control; selecting relevant parameters for the source and decision is.

CONTROL ACTION

Link each monitored parameter to a source mechanism, method and decision threshold/boundary.

REQUIRED RECORDS

Parameter; analytical method; detection/quantification capability; gas flow; operating state; sampling location; legal/BAT/permit basis.

AUDIT / ESCALATION TRIGGER

Escalate substitution of a portable screening sensor for a required reference/standard method in a compliance claim.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P11

BAT 25 treatment technology map

CEPA-CL-MEAT002-P12

KEY

Treatment selection must match gas composition, flow, moisture, temperature, variability and target compounds; the current BAT technique set is not a ranking and no one technology should be assumed universally best.

BAT 25 Air-Control Technique Families

Technique selection follows stream characterization; this is not a technology ranking.

M2-V05

CONDENSATION

remove condensable fraction; non-condensables still need treatment

ADSORPTION

check media capacity, humidity and change out / regeneration

BIOFILTER

check gas condition, loading, moisture and biological operating window

BOILER COMBUSTION

check integration, combustion conditions and applicability

THERMAL OXIDATION

check combustion conditions, energy and downstream emissions

WET / BIO SCRUBBING

check soluble/reactive target, liquor chemistry and residual management

COMMON PRE-SELECTION QUESTIONS

What is the actual gas composition, flow, temperature, moisture, particulate load, operating variability, capture condition, residual stream and monitoring requirement?

Source: Commission Implementing Decision (EU) 2023/2749, BAT 25. Technique families are reproduced as scope context; final selection remains stream- and facility-specific.

M2-V05_BAT25_Technique_Families | Conceptual framework; no facility performance implied.

TECHNICAL BASIS

EU BAT 25 lists condensation, adsorption, biofilter, combustion in a steam boiler, thermal oxidation, wet scrubber and bioscrubber for its defined rendering/animal-by-product air-emission scope. The permission to use one or a combination of techniques supports a source-matching decision method rather than a universal winner.

DECISION INTERPRETATION

Use a screening matrix: source condition -> pretreatment need -> candidate controls -> target compounds -> operating window -> residuals -> monitoring -> reliability. Technology-specific efficiencies require evidence matched to actual gas conditions.

CONTROL ACTION

Require source data before technology selection or vendor quotation comparison.

REQUIRED RECORDS

Gas flow; concentration/load; moisture; temperature; particulate/aerosol; target compounds; variability; utilities; residual handling; space; uptime.

AUDIT / ESCALATION TRIGGER

Escalate vendor comparisons based on nominal percent removal without matched inlet conditions, operating window or residual-burden accounting.

Sources: M2-EV-004; CEPA method | Claim: CEPA-CL-MEAT002-P12

Condensation as first-stage control

CEPA-CL-MEAT002-P13

KEY

Condensation can remove condensable vapour/load before downstream treatment, but non-condensable malodorous gases still require further control.

TECHNICAL BASIS

EU BAT 25 explicitly states condensation is used together with one or more downstream techniques for non-condensable gases. Temperature, moisture and condensable fraction affect performance and downstream device conditions.

DECISION INTERPRETATION

Treat condensation as gas conditioning/source recovery, not as a complete odour solution.

CONTROL ACTION

Measure condenser inlet/outlet temperatures, condensate rate and downstream gas load/conditions.

REQUIRED RECORDS

Gas flow; temperature; condensate; pollutant/odour data; non-condensable flow; cooling duty; residual-water handling.

AUDIT / ESCALATION TRIGGER

Escalate claims of full odour control where non-condensables are untreated or unmeasured.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P13

Biofilters and bioscrubbers

CEPA-CL-MEAT002-P14

KEY

Biological odour controls require stable gas loading, moisture and media/biomass condition; they are not passive boxes with fixed efficiency.

TECHNICAL BASIS

BAT 25 includes biofilters and bioscrubbers. Their suitability depends on pollutant biodegradability, temperature, humidity, load variability, pressure drop and maintenance.

DECISION INTERPRETATION

Use biological controls where gas character and operating discipline fit; include upset/bypass planning.

CONTROL ACTION

Define operating windows and monitoring for moisture, pressure drop, recirculation chemistry/biomass and gas loading as applicable.

REQUIRED RECORDS

Gas flow/loading; temperature/humidity; pressure drop; media age; irrigation/recirculation; pH/nutrients where relevant; outlet data; downtime.

AUDIT / ESCALATION TRIGGER

Escalate performance claims without inlet conditions, operating state or maintenance evidence.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P14

Wet scrubbing

CEPA-CL-MEAT002-P15

KEY

Wet scrubbing transfers selected gas-phase compounds into a liquid phase; removal performance and wastewater/reagent burden must be controlled together.

TECHNICAL BASIS

BAT 25 includes wet scrubbers for relevant rendering/ABP gases. Gas-liquid contact, reagent chemistry, liquid-to-gas ratio and pollutant properties influence removal, while spent liquor creates a downstream residual.

DECISION INTERPRETATION

Use removal efficiency together with liquid/reagent use and residual treatment; do not report air improvement without cross-media accounting.

CONTROL ACTION

Define reagent/recirculation controls and residual-liquor destination before commissioning.

REQUIRED RECORDS

Inlet/outlet gas; flow; reagent concentration/use; pH; blowdown; wastewater load; maintenance; bypass.

AUDIT / ESCALATION TRIGGER

Escalate air-emission improvement that creates unquantified wastewater or chemical burden.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P15

Combustion and thermal oxidation

CEPA-CL-MEAT002-P16

KEY

Combustion-based odour treatment can destroy organic/malodorous compounds but introduces fuel/energy demand and combustion-emission controls.

TECHNICAL BASIS

BAT 25 includes combustion in a steam boiler and thermal oxidation for scoped gases. Suitability depends on gas composition, heating value, moisture, variability and safe integration.

DECISION INTERPRETATION

Evaluate destruction, fuel penalty, NOx/CO and heat-recovery opportunities within the applicable regulatory/permit framework.

CONTROL ACTION

Create a combustion-balance and operating-envelope record for every routed malodorous gas stream.

REQUIRED RECORDS

Gas flow/composition; burner/oxidizer temperature; residence/control parameters; supplemental fuel; CO/NOx/other monitored emissions; heat recovery; trips/bypass.

AUDIT / ESCALATION TRIGGER

Escalate odour-destruction claims that ignore bypass or combustion-related emissions/energy.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P16

Adsorption and media management

CEPA-CL-MEAT002-P17

KEY

Adsorption capacity is finite and highly sensitive to gas composition, moisture, temperature and competing compounds; breakthrough management is the control problem.

TECHNICAL BASIS

BAT 25 includes adsorption as a control option. Media systems can suit polishing or lower-flow applications but require changeout/regeneration planning and spent-media disposition.

DECISION INTERPRETATION

Define breakthrough criteria and duty cycle before using nominal media capacity in design claims.

CONTROL ACTION

Monitor inlet/outlet indicators and media life by actual service conditions.

REQUIRED RECORDS

Gas flow; composition; humidity/temperature; media type/mass; pressure drop; breakthrough indicator; changeout date; spent-media route.

AUDIT / ESCALATION TRIGGER

Escalate fixed replacement intervals with no condition/performance evidence where loading is variable.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P17

Treatment-train selection

CEPA-CL-MEAT002-P18

KEY

No single odour-control technology is universally preferred; the treatment train must follow source character, capture, variability and required outcome.

TECHNICAL BASIS

BAT 25 deliberately permits combinations of techniques. Condensation can precede non-condensable treatment; biological, scrubbing, adsorption and combustion options have different load/operability/cross-media profiles.

DECISION INTERPRETATION

Use hard safety/applicability gates, then compare technical performance, reliability, cross-media impacts and cost.

CONTROL ACTION

Create a source-by-source treatment selection matrix.

REQUIRED RECORDS

Source flow; composition; temperature/humidity; variability; required outcome; technology operating window; residuals; energy; maintenance; CAPEX/OPEX.

AUDIT / ESCALATION TRIGGER

Escalate technology selection based on one vendor removal percentage without source matching and independent evidence.

Sources: M2-EV-001, M2-EV-004; CEPA method | Claim: CEPA-CL-MEAT002-P18

BAT-AEL interpretation and scope

CEPA-CL-MEAT002-P19

KEY

EU Table 1.10 values are BAT-associated emission levels for specified channelled sources; they are not universal meat-sector odour limits.

EU BAT 25 — Table 1.10 Scope Card

Channelled emissions from rendering, fat melting, blood and/or feather processing only.

M2-V06

ODOUR

200–1 100

 ouE/m³

TVOC

0.5–16

 mg C/Nm³

NH3

0.1–4

 mg/Nm³

H2S

<0.1–1

 mg/Nm³

CONTROLLING FOOTNOTES / BOUNDARIES

- Odour range may not apply to combustion meeting the specified high-temperature / residence-time conditions with ≥99% odour abatement or no perceptible process odour.
- For non-combustion abatement, odour upper end may be up to 3 000 ouE/m³ when efficiency is ≥92% or process odour is not perceptible.
- NH3 upper end may be up to 7 mg/Nm³ for combustion of malodorous gases.
- H2S range applies only when H2S is identified as relevant in the waste-gas inventory under BAT 2.
- Associated monitoring is BAT 8. These are BAT-AELs, not universal legal limits or generic performance guarantees.

Source: Commission Implementing Decision (EU) 2023/2749, BAT 25, Table 1.10 and footnotes. Preserve full applicability, averaging/reference conditions and permit context in publication use.

M2-V06_BAT25_Table_1_10_Scope_Card | Conceptual framework; no facility performance implied.

TECHNICAL BASIS

For scoped rendering/fat-melting/blood/feather processes, current Decision 2023/2749 gives BAT-AEL ranges for odour concentration, TVOC, NH3 and H2S with footnotes and associated BAT 8 monitoring. The decision has a 2024 corrigendum that must be reflected in the monitoring table.

DECISION INTERPRETATION

Keep process, channelled-source, unit/reference condition, averaging and footnote boundaries attached to every BAT-AEL citation.

CONTROL ACTION

Build an applicability note adjacent to any BAT-AEL figure or table.

REQUIRED RECORDS

Installation/process; source; parameter; unit; reference conditions; averaging; footnotes; monitoring method/frequency; legal status.

AUDIT / ESCALATION TRIGGER

Escalate charts that compare BAT-AELs directly with unrelated diffuse/receptor measurements or non-EU permit limits.

Sources: M2-EV-001, M2-EV-002, M2-EV-004 | Claim: CEPA-CL-MEAT002-P19

Odour concentration versus odour emission rate

CEPA-CL-MEAT002-P20

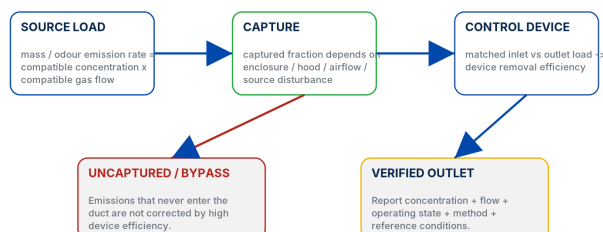
KEY

Odour concentration alone does not describe total source load; gas flow is required to calculate an odour emission rate.

Concentration, Flow, Capture and Device Removal

Keep source load, capture efficiency and treatment efficiency as different quantities.

M2-V07



Sources: EU BAT monitoring/air-control architecture; CEPA quantitative method. Device removal efficiency is not facility capture efficiency; gas bases must be compatible.

M2-V07_Load_Capture_Removal | Conceptual framework; no facility performance implied.

TECHNICAL BASIS

A high concentration at very low flow can have a different emission significance than a lower concentration at high flow. Standardized odour concentration and representative gas flow/operating state therefore support different questions.

DECISION INTERPRETATION

Report concentration and emission rate separately where data quality allows; do not back-calculate receptor impact from stack concentration alone.

CONTROL ACTION

Pair olfactometry results with synchronized flow and process-state records.

REQUIRED RECORDS

Odour concentration; gas flow; sampling time; operating state; stack conditions; replicate/sample method; uncertainty.

AUDIT / ESCALATION TRIGGER

Escalate source rankings based only on concentration when flow differs materially.

Sources: M2-EV-001; EN 13725 reference; CEPA quantitative method | Claim: CEPA-CL-MEAT002-P20

Capture efficiency and untreated bypass

CEPA-CL-MEAT002-P21

KEY

Control-device removal efficiency is not facility capture efficiency; emissions that bypass the hood/duct or treatment train must remain visible.

TECHNICAL BASIS

BAT source-near extraction/enclosure concepts reinforce the first control step. Doors, open tanks, negative-pressure loss, maintenance bypasses and overloaded ducts can dominate residual emissions even when device outlet performance is strong.

DECISION INTERPRETATION

Track source capture coverage and bypass hours separately from control-device removal efficiency.

CONTROL ACTION

Establish airflow/pressure checks and bypass event logging for critical sources.

REQUIRED RECORDS

Design airflow; measured airflow/pressure; enclosure state; bypass valve/status; downtime; source operating hours; outlet monitoring.

AUDIT / ESCALATION TRIGGER

Escalate "95% control" claims that refer only to device efficiency with unknown capture fraction.

Sources: M2-EV-001; CEPA method | Claim: CEPA-CL-MEAT002-P21

Removal efficiency and mass-load accounting

CEPA-CL-MEAT002-P22

KEY

Removal efficiency is meaningful only when inlet and outlet measurements use compatible basis, flow, timing and operating conditions.

TECHNICAL BASIS

Concentration reduction can be distorted by dilution or moisture changes. Mass load combines concentration with gas flow and can better support treatment-accountability where measurements are representative.

DECISION INTERPRETATION

Use paired inlet/outlet data and report basis/reference conditions; distinguish measured from estimated flows.

CONTROL ACTION

Standardize test plans for each treatment train.

REQUIRED RECORDS

Inlet/outlet concentration; flow; temperature/moisture; reference conditions; operating state; sample method; calculation; uncertainty.

AUDIT / ESCALATION TRIGGER

Escalate efficiency values above/below expected range without checking dilution, flow mismatch and sampling state.

Sources: M2-EV-001, M2-EV-004; CEPA quantitative method | Claim: CEPA-CL-MEAT002-P22

Reliability, OTNOC and downtime

CEPA-CL-MEAT002-P23

KEY

Annual emission performance can be dominated by abnormal operating conditions even if normal-state tests pass.

TECHNICAL BASIS

EU BAT includes management of other-than-normal operating conditions (OTNOC), critical equipment failures, cause analysis and corrective action. Odour systems also face trips, fan failures, media exhaustion, scrubber chemistry loss and maintenance bypass.

DECISION INTERPRETATION

Track availability, bypass and high-emission events as core performance metrics.

CONTROL ACTION

Create a critical-control equipment register with alarm/trip and contingency response.

REQUIRED RECORDS

Operating hours; treatment available hours; bypass duration; failure code; alarms; maintenance; emissions/complaints during event; corrective action.

AUDIT / ESCALATION TRIGGER

Escalate recurring OTNOC events or annual KPIs that exclude downtime emissions without disclosure.

Sources: M2-EV-001, M2-EV-002 | Claim: CEPA-CL-MEAT002-P23

Raw-material freshness and residence time

CEPA-CL-MEAT002-P24

KEY

Preventing odour formation through freshness, temperature and residence-time control can reduce gas-treatment load before capture equipment is involved.

TECHNICAL BASIS

Earlier MEAT-001 discussed material handling at broad resource-value level. Current BAT odour management supports source prevention/control; Issue 002 narrows this to emission-generation mechanisms and air-system consequences.

DECISION INTERPRETATION

Treat extended warm storage/queue time as an air-control variable and correlate it with source events.

CONTROL ACTION

Define maximum/target residence and temperature controls appropriate to the material/process and jurisdiction.

REQUIRED RECORDS

Receipt/time; material temperature; storage condition; processing delay; rejection/upset; odour/compound indicators; season/ambient.

AUDIT / ESCALATION TRIGGER

Escalate odour spikes that coincide with material-delay excursions but are addressed only by increasing treatment capacity.

Sources: M2-EV-001; MEAT-001 continuity | Claim: CEPA-CL-MEAT002-P24

Housekeeping and source isolation

CEPA-CL-MEAT002-P25

KEY

Prompt removal of residues, closed transfer and clean source areas reduce diffuse emissions and prevent treatment systems from carrying avoidable load.

TECHNICAL BASIS

Housekeeping was a broad operational control in MEAT-001. Here it is treated as source isolation: preventing material accumulation, open residues and uncontrolled drains/tanks from becoming diffuse air sources.

DECISION INTERPRETATION

Define measurable response times and source-condition checks rather than generic "keep area clean" instructions.

CONTROL ACTION

Integrate odour-source checks into sanitation/maintenance inspections.

REQUIRED RECORDS

Area/source ID; residue condition; cleaning/removal time; covers/closures; drain/tank state; deviation; corrective action.

AUDIT / ESCALATION TRIGGER

Escalate recurring diffuse sources without an assigned process owner.

Sources: M2-EV-001; MEAT-001 continuity | Claim: CEPA-CL-MEAT002-P25

Meteorology, dispersion and receptor context

CEPA-CL-MEAT002-P26

KEY

Source emissions and receptor concentrations are connected through atmospheric dispersion; meteorology, terrain, source configuration and receptor location must be considered when a source-to-receptor attribution is required.

TECHNICAL BASIS

BAT 18 links odour management to nuisance at sensitive receptors. For U.S. regulatory dispersion work, EPA's current AERMOD system uses meteorological processing (AERMET), terrain processing (AERMAP) and receptor/source information; the current model/documentation was updated in July 2026. The specific modeling method remains jurisdiction- and purpose-dependent.

DECISION INTERPRETATION

Use local meteorology as diagnostic context and validated dispersion methods where modeling is required; complaint direction alone cannot establish source contribution.

CONTROL ACTION

Log local wind/weather with significant events and engage qualified dispersion modeling under the applicable regulatory/technical method when needed.

REQUIRED RECORDS

Wind speed/direction; temperature; stability/meteorological inputs as applicable; source/receptor coordinates; terrain; source geometry; event time; operating state.

AUDIT / ESCALATION TRIGGER

Escalate source-attribution claims made without operating-state, meteorological and receptor/source-location support.

Sources: M2-EV-001, M2-EV-006; CEPA method | Claim: CEPA-CL-MEAT002-P26

Complaint and incident intelligence

CEPA-CL-MEAT002-P27

KEY

Complaints are operational intelligence but not a calibrated emission measurement.

TECHNICAL BASIS

BAT 18 odour management includes incident/complaint response and source identification. Complaint frequency also depends on population, awareness, wind and reporting behaviour.

DECISION INTERPRETATION

Use complaints to trigger source/event investigation and verify corrective actions; do not equate zero complaints with zero emissions.

CONTROL ACTION

Create a complaint-event correlation workflow with timestamped plant operations and meteorology.

REQUIRED RECORDS

Time/location; description; wind; operating state; source alarms; treatment status; investigation; corrective action; closeout.

AUDIT / ESCALATION TRIGGER

Escalate repeated complaint clusters or closures with no identified source hypothesis/evidence.

Sources: M2-EV-001 | Claim: CEPA-CL-MEAT002-P27

AP-42 factors: historical screening, not current compliance

CEPA-CL-MEAT002-P28

KEY

EPA AP-42 meat-rendering factors are historical estimation tools and should not be presented as current legal limits or direct substitutes for site measurement.

TECHNICAL BASIS

EPA's public Chapter 9 includes older sections for meat packing/rendering. Such factors can help inventory screening when appropriate, but age, source category, technology and operating conditions limit transferability.

DECISION INTERPRETATION

Prefer current permit methods/site tests for compliance and control verification; label AP-42 use as estimation/context.

CONTROL ACTION

Record factor vintage, source category, activity basis and applicability assessment.

REQUIRED RECORDS

Factor; publication year; source category; activity data; control status; calculation; uncertainty; purpose.

AUDIT / ESCALATION TRIGGER

Escalate emissions inventories using AP-42 values without factor applicability or control-device basis.

Sources: M2-EV-005 | Claim: CEPA-CL-MEAT002-P28

Cross-media burden and residuals

CEPA-CL-MEAT002-P29

KEY

Odour treatment can transfer burden to wastewater, chemicals, spent media, condensate or fuel use; the control decision must reconcile those outputs.

TECHNICAL BASIS

Wet scrubbers and bioscrubbers generate liquid residuals; adsorption generates spent media; thermal treatment uses fuel and creates combustion emissions; condensers create condensate.

DECISION INTERPRETATION

Report air improvement together with significant residual streams and energy use.

CONTROL ACTION

Add cross-media outputs to every treatment-train performance sheet.

REQUIRED RECORDS

Water/reagent/fuel/electricity; condensate; scrubber blowdown; spent media; sludge; downstream treatment; emission changes.

AUDIT / ESCALATION TRIGGER

Escalate control projects whose air benefit is achieved by unquantified offsite/liquid residual transfer.

Sources: M2-EV-001, M2-EV-004 | Claim: CEPA-CL-MEAT002-P29

Air/odour control economics

CEPA-CL-MEAT002-P30

KEY

Odour-control economics should include capture/enclosure, ducting, conditioning, treatment, residuals, energy, maintenance, downtime and risk-not only device CAPEX.

TECHNICAL BASIS

Technology selection is source-specific; a low-CAPEX device can be expensive if media/reagent replacement or downtime is high. Source prevention may reduce both load and operating cost.

DECISION INTERPRETATION

Compare total annualized cost among technically qualified options and model high-load/upset cases.

CONTROL ACTION

Require operating-cost and reliability evidence in vendor/project evaluation.

REQUIRED RECORDS

CAPEX; fan/energy; water/reagent/fuel; media; maintenance; residual treatment; labor; uptime; source-prevention cost; uncertainty.

AUDIT / ESCALATION TRIGGER

Escalate bids quoting removal efficiency/CAPEX without operating envelope and consumables.

Sources: M2-EV-001, M2-EV-004; CEPA economics | Claim: CEPA-CL-MEAT002-P30

Monitoring plan and evidence hierarchy

CEPA-CL-MEAT002-P31

KEY

Monitoring should answer defined control questions: source relevance, capture, treatment performance, compliance/BAT comparison, upset diagnosis or receptor response.

TECHNICAL BASIS

EU BAT 8 links parameters and standards to particular processes; the 2024 corrigendum must be used. Odour concentration uses EN 13725 in the BAT framework where applicable.

DECISION INTERPRETATION

Avoid over-monitoring low-value parameters while missing flow, operating state or bypass data needed to interpret results.

CONTROL ACTION

Create a parameter/source/frequency/method matrix tied to decisions and legal/BAT applicability.

REQUIRED RECORDS

Source; parameter; method/standard; frequency; operating condition; flow; QA/QC; locator; owner; action threshold.

AUDIT / ESCALATION TRIGGER

Escalate results with missing process state, flow/reference condition or applicable method information.

Sources: M2-EV-001, M2-EV-002, M2-EV-003 | Claim: CEPA-CL-MEAT002-P31

Executive air/odour dashboard

CEPA-CL-MEAT002-P32

KEY

The dashboard should separate source coverage, emissions/load, device performance, reliability, complaints and cross-media burden.

TECHNICAL BASIS

Recommended measures include source capture coverage, relevant pollutant/odour values, odour emission rate where justified, device removal efficiency, treatment availability/bypass, reagent/media intensity and event/complaint correlation.

DECISION INTERPRETATION

Do not combine unlike source parameters into one "odour score."

CONTROL ACTION

Publish source-specific KPI definitions and trend major sources separately.

REQUIRED RECORDS

Numerator/denominator; source; method; period; operating state; uncertainty; owner; control/action limits.

AUDIT / ESCALATION TRIGGER

Escalate dashboard improvements caused by less monitoring, excluded downtime or changed source coverage.

Sources: M2-EV-001..005; CEPA metrics | Claim: CEPA-CL-MEAT002-P32

Air-control failure register

CEPA-CL-MEAT002-P33

KEY

Failure modes should be coded by source/capture/treatment mechanism so corrective action targets the real control layer.

TECHNICAL BASIS

Examples include raw-material delay, open source, capture fan failure, duct leak, condenser overload, scrubber chemistry loss, biofilter drying/channeling, media breakthrough, oxidizer trip and bypass.

DECISION INTERPRETATION

Rank failures by duration, load/risk and recurrence rather than complaint count alone.

CONTROL ACTION

Maintain a failure/event register linked to maintenance and corrective-action verification.

REQUIRED RECORDS

Failure code; source; start/end; emissions/complaints; root cause; temporary control; repair; verification; recurrence.

AUDIT / ESCALATION TRIGGER

Escalate repeat high-load failures or chronic bypass without engineering change.

Sources: M2-EV-001, M2-EV-002; CEPA method | Claim: CEPA-CL-MEAT002-P33

Source-control decision tree

CEPA-CL-MEAT002-P34

KEY

The preferred sequence is prevent formation where practicable -> enclose/capture -> condition -> treat -> monitor -> manage residuals and OTNOC.

TECHNICAL BASIS

This sequence prevents expensive end-of-pipe equipment from compensating for avoidable open sources or poor capture. BAT 25 technique choice then follows actual gas characteristics.

DECISION INTERPRETATION

Use hard safety/applicability gates and choose combination controls when one technique cannot cover the source profile.

CONTROL ACTION

Implement the tree for new sources, recurring complaints and treatment upgrades.

REQUIRED RECORDS

Source characterization; prevention option; capture; gas conditions; treatment screen; residuals; monitoring; economics; decision/approval.

AUDIT / ESCALATION TRIGGER

Escalate technology procurement before source/capture characterization is complete.

Sources: M2-EV-001, M2-EV-004; CEPA method | Claim: CEPA-CL-MEAT002-P34

Odour-control commissioning and upset-response protocol

CEPA-CL-MEAT002-P35

KEY

Air/odour systems should be commissioned against source capture, treatment performance and abnormal-condition response-not merely equipment start-up.

TECHNICAL BASIS

Pre-start acceptance: confirm source inventory, enclosure/extraction, duct integrity, critical instruments and residual-management routes. Performance acceptance: test representative normal and credible high-load operating states using the applicable monitoring basis. Upset acceptance: demonstrate alarms, bypass controls, standby/contingency response, complaint/event investigation and recovery from critical equipment failure.

DECISION INTERPRETATION

A treatment device that meets one normal-state outlet test but cannot maintain capture or manage OTNOC is not a fully commissioned source-control system.

CONTROL ACTION

Use a signed commissioning matrix linking every material source to capture, treatment, monitoring, failure response and responsible owner.

REQUIRED RECORDS

Source/capture checks; airflow/pressure; inlet/outlet performance; operating state; residuals; alarm/trip tests; bypass/standby test; maintenance handoff; corrective actions.

AUDIT / ESCALATION TRIGGER

Escalate commissioning closeout with untested bypass paths, unresolved capture defects, missing high-load evidence or no defined response to critical treatment failure.

Sources: M2-EV-001..004; CEPA method | Claim: CEPA-CL-MEAT002-P35

CEPA TECHNICAL INTELLIGENCE BRIEF | SOURCE & NOVELTY CONTROL

Source register, claim index and future-territory guard

CEPA-CL-MEAT002-P36

KEY

Issue 002 closes with a controlled source/claim register and preserves MEAT-001 yield/recovery/refrigeration territory from repetition.

TECHNICAL BASIS

The issue is limited to odour/air source-control systems. It does not reopen retained-water calculations, broad refrigeration optimization, whole-facility by-product economics or general wastewater treatment except where they create/receive air-control burdens.

DECISION INTERPRETATION

Future MEAT issues must compare against all released MEAT briefs before charter acceptance.

CONTROL ACTION

Archive the complete-series novelty audit and open evidence questions.

REQUIRED RECORDS

Source URLs/locators; claim IDs; novelty lineage; metric definitions; applicability notes; unresolved gaps; future-theme ledger.

AUDIT / ESCALATION TRIGGER

Escalate any final executive finding that reproduces MEAT-001 rather than extending its one-page odour overview.

Sources: M2-EV-001...005; OPS-019 | Claim: CEPA-CL-MEAT002-P36

Controlled source register

Official/current source spine used by this issue. Scope and applicability boundaries remain controlling.

M2-EV-001	Commission Implementing Decision (EU) 2023/2749 - slaughterhouses/animal by-products BAT Scope; BAT 2; BAT 18; source control	eur-lex.europa.eu
M2-EV-002	Corrigendum to Decision (EU) 2023/2749 - OJ L 2024/90008 Corrected BAT 8 monitoring material	eur-lex.europa.eu
M2-EV-003	Decision (EU) 2023/2749 - BAT 8 monitoring Process/parameter/frequency/footnote controls	eur-lex.europa.eu
M2-EV-004	Decision (EU) 2023/2749 - BAT 25 and Table 1.10 Treatment families and scope-bounded channelled BAT-AELs	eur-lex.europa.eu
M2-EV-005	U.S. EPA AP-42 Chapter 9.5.3 - Meat Rendering Historical process/emissions-factor context only	www.epa.gov
M2-EV-006	U.S. EPA - Air Quality Dispersion Modeling: Preferred and Recommended Models AERMOD v26135 / July 2026 model context	www.epa.gov

Status sweep: 27 September 2026. Current-status/source-survivability check must be repeated at the T-3 release gate.

DECISION-GRADE TECHNICAL INTELLIGENCE

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