

Shrimp Health and Welfare

Draft indicators

This is a proposal for a set of indicators to cover shrimp health and welfare. These indicators have been developed by a [technical working group \(TWG\)](#) of experts.

Some indicators in the ASC Farm Standard have been broadened in scope to cover shrimp health and welfare needs and are copied below for a better understanding of the full proposed requirements for shrimp. New indicators and modifications to already existing indicators on fish welfare proposed in the Farm Standard are highlighted in bold.

The document is structured following the structure used for the Fish Health and Welfare content in the ASC Farm Standard draft:

- a) Shrimp origin
- b) Routine health and welfare
- c) Handling operations
- d) Slaughter operations
- e) Veterinary therapeutants

New indicators covering shrimp origin

Scope: Shrimp nauplii, larvae, post-larvae or broodstock

Indicator	Requirement
1.	The shrimp supplier shall ensure that all shrimp supplier employees are informed and aware of the importance of fish health and welfare, according to Appendix xyz.
2.	The shrimp supplier shall ensure that all people involved in fish husbandry and handling operations are trained on fish health and welfare, according to Appendix xyz.
3.	The shrimp supplier shall only stock nauplii, larvae or post-larvae (PL) raised in hatcheries¹.
4.	The shrimp supplier shall monitor ² production daily for mortality.
5.	The shrimp supplier shall remove ³ mortality when spotted.
6.	The shrimp supplier shall collect moribund shrimp when spotted.
7.	The UoC (in coordination with the shrimp supplier) shall test ⁴ every batch ⁵ of animals for diseases of regional concern prior to stocking the grow-out phase on farm.
8.	The shrimp supplier shall, if a WHO-notifiable disease is confirmed, report to the authorities and apply the measures required as per the national regulations.
9.	The shrimp supplier shall have a designated veterinarian or a fish health manager who performs regular site visits, at least in cases of fish health or welfare concerns.
10.	<p>The shrimp supplier shall assess site-specific characteristics and develop a shrimp Health and Welfare Management System (SHWMS) accordingly. The shrimp supplier implements and monitors the FHWMS for its effectiveness, with the objective of preventing disease outbreaks and ensuring good health and welfare of farmed animals. The shrimp supplier includes at least the following in the SHWMS:</p> <ul style="list-style-type: none"> a) a site-specific disease and welfare monitoring programme for diseases of regional concern, response mechanisms and reporting requirements (including reporting WHO-notifiable disease to authorities). b) a site-specific biosecurity procedure to identify and minimise spreading of disease, including risk pathways into/out of and within the farm. d) FHWMS overseen and signed-off by a veterinarian.

¹ Allowance for wild-caught PL, other than natural tidal flow into pond, may apply for *Penaeus monodon* in extensive aquaculture systems.

² The shrimp supplier shall keep a record of the situation when daily monitoring was not possible. Possible causes that would justify no daily monitoring of mortality are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans.

³ The shrimp supplier shall keep a record of the situation when daily removal was not possible. Possible causes that would justify no daily removal of mortality are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans. All mortality shall be disposed responsibly as per indicators 2.12.22 and 2.12.23.

⁴ Testing is understood as the application of diagnostic techniques scientifically recognised as valid to diagnose the disease of interest. Such techniques might include histopathology, microbiology, molecular technology or veterinary inspection (only in the case of pathognomonic diseases).

⁵ Organisms in homogeneous developmental stages coming from the same breeder.

	<p>e) a review and where needed a revision of the FHWMS when changes in farming activities or changes in external factors occur, following each production cycle⁶, or upon the direction of the veterinarian.</p> <p>x) an information feedback mechanism between UoC and shrimp supplier, so health information is shared and integrated.</p>
11.	<p>The shrimp supplier treatment records must be available including the following minimum information:</p> <ul style="list-style-type: none"> • the name, address and telephone number of the person prescribing the product; • the qualifications enabling the person to prescribe the product (e.g. relevant title or number of affiliation to a relevant veterinary college); • the name and address of the owner or keeper of the animals. • the identification (including the species) of the group of animals to be treated; • the premises at which the animals are kept if this is different from the address of the owner or keeper; • the date of the prescription; • the signature or other authentication of the person prescribing the product; • the name and amount of the product prescribed; • the reason to treat; • the dosage and administration instructions; • any necessary warnings; • - the withdrawal period.
12.	<p>The shrimp supplier shall ensure an acclimation period is applied before and during transfer to avoid sudden changes in temperature, oxygen, salinity, pH, diet and feeding regimes.</p>
13.	<p>The shrimp supplier shall assess site-specific characteristics and develop a Shrimp Handling Management System (SHMS) accordingly. The shrimp supplier implements and monitors the SHMS for its effectiveness with the objective of ensuring good health and welfare of farmed animals. The shrimp supplier includes at least the following in the SHMS:</p> <p>a) separate processes for each type of handling that may occur on the site i.e., live post-larvae or shrimp transport (including loading, transfer and unloading), and other procedures that may result in crowding.</p> <p>b) contingency plans for processes described in a), including at least the following:</p> <ul style="list-style-type: none"> - Immediate emergency response back up for system failure. - Immediate emergency culling response measure following responsible stunning and killing according to 2.14c. <p>c) description of the system⁷ to be used e.g., live shrimp transport system,</p> <p>d) biosecurity measures specific to the type of handling, following the parameters in 2.14a.16 b), to avoid the transfer of disease,</p> <p>f) a fitness assessment⁸ of the animals approved by a veterinarian or a fish health manager within a two-day period prior to the handling; in the case of serial, repeated handling, the fitness assessment should be carried out at least weekly.</p> <p>g) behaviour (e.g. swimming activity, poor or erratic swimming) before handling;</p>

⁶ For farms with production cycles shorter than one-year or using continuous stocking/cropping methods – review annually. For farms with production cycles longer than one-year or using all-in-all-out stocking/cropping methods (e.g., salmon) – review following each production cycle.

⁷ System refers to any equipment, tools, or machinery being used during a particular handling operation. In requirement 2.15.1 d) The site shall describe the systems so a clear list of what is needed and of which specifications is available to anybody carrying out the procedure. In requirement 2.15.1 b) The site shall outline the process it will be carrying out.

⁸ A fitness assessment shall include at least the revision of production data (e.g. feeding rates), the examination of random **healthy shrimp morphologic parameters, and the examination of moribund and dead shrimp if present. In the context of this criterion morphologic parameters refers to size (including length uniformity), weight, occurrence of deformities, colour, muscle/gut ratio, gill and digestive system morphology.**

	<p>h) 98% survival rate to at least one stress test (e.g. salinity, formalin or ammonia stress test) before transportation to grow out ponds;</p> <p>i) water quality monitoring and corrective actions in line with 2.14a.16.1., 5., 6., and 7., including at least the following:</p> <ul style="list-style-type: none"> - Description of monitoring equipment - Monitoring frequency: prior to, during, and post handling. In the case of live transport, this means monitoring at the point of departure and arrival. - Monitoring parameters; at a minimum temperature, pH, and oxygen level <p>i) visual inspection and corrective actions, in line with 2.14a.16.3, 5., 6., and 7., including at least the following:</p> <ul style="list-style-type: none"> - Visual inspection frequency: during handling - Visual inspection parameters: abnormal behaviour specific to the type of handling, <p>k) The shrimp supplier shall have a handling log, in the form of a recording template, which captures a)-j) for each handling event.</p>
<p>14.</p>	<p>The UoC shall purchase nauplii, larvae or PL from the nearest shrimp supplier, unless demonstrates considerations to ensure welfare conditions are maintained during the journey (e.g. stocking density reduction).</p>

Sub-criterion 2.14a - Fish Health and Welfare

Scope: Shrimp

Indicator	Requirement
2.14a.1	The UoC shall ensure that all UoC employees are informed and aware of the importance of fish health and welfare, according to Appendix xyz.
2.14a.1.1	The UoC shall ensure that all people involved in fish husbandry and handling operations are trained on fish health and welfare, according to Appendix S.
2.14a.4	The UoC shall monitor ⁹ production daily for mortality.
2.14a.4.1	Mortality shall be removed ¹⁰ when spotted for shrimp and abalone, and at least every second day for finfish.
2.14a.5	The UoC shall collect moribund finfish daily ¹¹ and stun and kill ¹² . Moribund ¹³ shrimp shall be removed when spotted.
2.14a.6	The UoC shall adhere to species-specific limits on survival rates as per Appendix 1.

⁹ The UoC shall keep a record of the situation when daily monitoring was not possible. Possible causes that would justify no daily monitoring of mortality are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans.

¹⁰ The UoC shall keep a record of the situation when daily removal was not possible. Possible causes that would justify no daily removal of mortality are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans. All mortality shall be disposed responsibly as per indicators 2.12.22 and 2.12.23.

¹¹ The UoC shall keep a record of the situation when daily removal was not possible. Possible causes that would justify no daily removal of moribund are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans.

¹² Using permitted methods.

¹³ **For the purpose of this criteria, moribund shrimp refers to individuals lethargic, ceasing feeding, aggregated near the water surface or at the edge of the pond or tank.**

2.14a.7	The UoC shall test ¹⁴ every batch ¹⁵ of animals for selected diseases of regional concern prior to stocking the grow-out phase on farm.
2.14a.8	The UoC shall, if an WHO-notifiable disease is confirmed, immediately report to the authorities and apply the measures required by the national regulations.
2.14a.9	The UoC shall have a designated veterinarian or a health manager who performs regular site visits, at least annually for all species and quarterly for salmon, as well as in cases of health or welfare concerns.
2.14a.12	The UoC shall feed animals a diet that is formulated in accordance with species and life-stage specific nutritional requirements, based on feed manufacturer specification, unless such diets are not available. If not available, the UoC shall feed a diet suitable for animals with similar nutritional needs, and actively collaborate with feed manufacturers to work towards the development of a species/life-stage-specific diet.
2.14a.13	The UoC shall not use feed which has expired or is spoiled.
2.14a.14	The UoC shall develop and implement a feeding plan, including at least the following parameters: <ul style="list-style-type: none"> • time and frequency of feeding • feed rations • feeding adaptation to fit different life stages • - feeding adaptation to fit different ambient conditions
2.14a.15	The UoC shall use feeding methods that ensure feed is accessible to all animals and well distributed in the production unit, in order to minimise competition.
2.14a.15.1	The UoC must carry out a quality check upon arrival at the farm. This shall include monitoring water quality parameters, PL activity, physical damage and compromised welfare¹⁶.
2.14a.16	The UoC shall assess site-specific characteristics and develop a Fish Health and Welfare Management System (FHWMS) accordingly. The UoC implements and monitors the FHWMS for its effectiveness, with the objective of preventing disease outbreaks and ensuring good health and welfare of farmed animals. The UoC includes at least the following in the FHWMS: <ol style="list-style-type: none"> a) a site-specific disease monitoring, response mechanisms and reporting requirements (including reporting WHO-notifiable disease to authorities). b) a site-specific biosecurity procedure to identify and minimise spreading of disease, including risk pathways into/out of and within the farm. c) a list of potential predators and any predator control measures needed, to avoid compromising the integrity of the containment system and the health and welfare of the fish. d) FHWMS overseen and signed-off by a veterinarian. e) a review and where needed a revision of the FHWMS when changes in farming activities or changes in external factors occur, following each production cycle¹⁷, or upon the direction of the veterinarian.

¹⁴ Testing is understood as the application of diagnostic techniques scientifically recognised as valid to diagnose the disease of interest. Such techniques might include histopathology, microbiology, molecular technology or veterinary inspection (only in the case of pathogenic diseases).

¹⁵ Organisms in homogeneous developmental stages coming from the same breeder.

¹⁶ **In the context of this criterion compromised welfare refers to lethargy, thigmotaxis and apathetic responses to handling.**

¹⁷ For farms with production cycles shorter than one-year or using continuous stocking/cropping methods – review annually. For farms with production cycles longer than one-year or using all-in-all-out stocking/cropping methods (e.g., salmon) – review following each production cycle.

2.14a.16.1	The FHWMS shall include a monitoring process of water quality, including at least the following: <ul style="list-style-type: none"> o Monitoring frequency (including minimum frequencies as per Table 1) o Monitoring parameters (including parameters as per Table 1) o Species-specific limits and monitoring requirements for water quality parameters (Appendix 1).
2.14a.16.2	The FHWMS shall include a monitoring process for morphological scoring on live shrimp including at least the following: <ul style="list-style-type: none"> o Monitoring frequency: site-appropriate frequency, being at least once a week¹⁸ o Morphological scoring parameters (Interpretation Manual for reference): <ul style="list-style-type: none"> • Exoskeleton damage (including eyes, antennas, appendages and rostrum) • Hepatopancreas colouration and size • Gill colouration • Size dispersion • Shell blisters and necrosis • Full/empty digestive tube and colouration • Loss of appendages¹⁹
2.14a.16.3	The FHWMS shall include a monitoring process for behavioural scoring (Interpretation Manual for reference) on live shrimp , including at least the following: <ul style="list-style-type: none"> ▪ Monitoring frequency: daily ▪ Behavioural scoring²⁰ parameters: site-appropriate types of abnormal behaviour to look out for.
2.14a.16.4	The FHWMS shall include a monitoring process for mortality including: <ul style="list-style-type: none"> o Monitoring frequency: daily o Monitoring parameters: <ul style="list-style-type: none"> • Classify all recovered mortalities • Carry out a post-mortem analysis for each mortality event²¹ • Investigate mortality events which remain unexplained or unattributed to shrimp health
2.14a.16.5	The FHWMS shall include a traffic light system for water quality, morphological scoring, behavioural scoring, and mortality, identifying ranges of acceptable levels (green), warning levels (amber), and unacceptable levels (red) of health and/or welfare. Increased monitoring and short-term corrective measures shall occur for the event of transgressing into the amber and red ranges for water quality, morphological scoring, behavioural scoring and mortality.
2.14a.16.6	The FHWMS shall include a mechanism for trend analysis to determine declining and improving health or welfare over time, including drivers of such trends, based on the following data: <ul style="list-style-type: none"> o water quality monitoring outcome (2.14a.16.1), o morphological scoring of live shrimp (2.14a.16.2), o behavioural scoring of live shrimp (2.14a.16.3), o mortality classification, post-mortem analysis result for mortality events, outcome of investigations carried out to clarify unexplained mortality events/events unattributed to shrimp health (2.14a.16.4), o feedback from the processing plant

¹⁸ A deviation from weekly monitoring is justified on the following grounds (reason for exemption must be documented):

- o Shrimp health – undergoing a disease event and/or being treated. In case the reason for the exemption is related to shrimp treatment, the maximum duration for the exception shall be two weeks.
- o During specific environmental events – water temperature, low oxygen, algal bloom, **rainy season**.

¹⁹ **Loss of appendages shall be segregated according to potential causes e.g., bacterial infection or cannibalism.**

²⁰ **In the context of this criterion behavioural scoring refers to verification of swimming activity and poor or erratic swimming.**

²¹ If on-site diagnosis is inconclusive, this Standard requires off-site laboratory diagnosis. A veterinarian, a biologist, or a professional with equivalent qualifications must conduct all diagnosis. One hundred percent of mortality events shall receive a post-mortem analysis, not necessarily every fish. A statistically relevant number of fish from the mortality event shall be analysed.

<p>2.14a.16.7</p>	<p>The FHWMS shall include a mortality reduction program, long-term shrimp health and welfare improvement measures²² as well as short-term mitigation measures to react to situations of declining health or welfare identified in 2.14a.16.5 This program shall outline measures to reduce annual/production cycle mortality and include defined annual targets for reductions in both total and unexplained mortality.</p>
<p>2.14a.16.8</p>	<p>The UoC shall follow these mortality reporting requirements:</p> <ul style="list-style-type: none"> o Report to the veterinarian or health manager all mortality events²³ o Report to the veterinarian or health manager if a welfare problem is suspected during mortality classification e.g., observation of physical damage on the shrimp o If an WHO-notifiable disease is confirmed: <ul style="list-style-type: none"> a. increase disease-testing/monitoring in other batches of animals b. coordinate oversight by the veterinarian or animal health specialist
<p>2.14a.17</p>	<p>The UoC shall, when an WHO-notifiable disease is confirmed on the farm, immediately notify farms within the ABM according to national legislation requirements.</p>
<p>2.14a.19</p>	<p>The UoC shall report to ASC the ranges of stocking densities during production, according to Appendix 2 and using the template provided on the ASC website.</p>
<p>2.14a.20</p>	<p>The UoC shall report to ASC survival rate yearly, according to Appendix 2 and using the template provided on the ASC website.</p>
<p>2.14a.21</p>	<p>Indicator scope: <i>Penaeus vannamei</i> and <i>Penaeus monodon</i> The UoC shall ensure that all nauplii, larvae or post-larvae (PL) to originate from ablation free²⁴ (AF) female broodstock.</p>

²² This shall include considering the adjustment of stocking densities, modification of the feeding system, improvement of water quality, improvement of handling, modification of enclosure characteristics, providing environmental enrichment, amongst others. A table including recommendations for density can be found in the Interpretation Manual.

²³ A mortality event is marked by a significant increase in daily mortality which can be sudden or occur and prolong over a period of time.

²⁴ The following timelines shall apply to *Penaeus vannamei*: 1) Date the standard is effective (Q2 2025): 25% of the production to originate from AF broodstock. 2) 2 years from the date the standard is effective (Q2 2027): 50% of the production to originate from AF broodstock. 3) 4 years from the date the standard is effective (Q2 2029): 100% of the production to originate from AF broodstock. The following timelines shall apply to *Penaeus monodon*: 1) 2 years from the date the standard is effective (Q2 2027): 25% of the production to originate from AF broodstock. 2) 4 years from the date the standard is effective (Q2 2029): 50% of the production to originate from AF broodstock. 3) 6 years from the date the standard is effective (Q2 2031): 100% of the production to originate from AF broodstock. Other crustaceans are not include within the indicator scope.

Table 1 of Annex xyz: Training requirements.

Destined to	Level	Refers to criteria	Frequency	Content	Format	Auditability
All staff working at the UoC	Basic	2.14, 2.15, 2.16	At least one-off at the time of employment	General fish health and welfare awareness: Employees need to be informed about the importance of fish health and welfare and understand these concepts.	Theory	Certificate of competency (employee understands the concepts and has been adequately informed). Revision of training resources/contents.
Site staff Staff handling live fish Production management	Advanced	2.14, 2.15, 2.16 + Parasites + Antibiotics	Annual (refresher shall incorporate advances/developments on the subject of training)	Basic anatomy and physiology of the species being farmed	Theory & Practice	Certificate of attendance. Revision of training resources/contents. Certificate of competency (signed off by a relevant person, certifying employee has acquired the knowledge, the skills and the abilities). Observation of real operations.
				Advanced fish health and welfare assessment: This shall include all welfare indicators in the standard (morphological, behavioural, water quality, feeding, stocking density, disease recognition, mortality classification and necropsy forms)		
				Handling		
				Slaughter (harvesting)		
				Biosecurity		
Processing staff Processing management	Advanced	2.16	Annual (refresher shall incorporate advances/developments on the subject of training)	Capacitation on slaughter process Assessment of stunning and killing effectiveness Data collection, logging and reporting systems	Theory & Practice	Certificate of attendance. Revision of training resources/contents. Certificate of competency (signed off by a relevant person, certifying employee has acquired the knowledge, the skills and the abilities). Observation of real operations.

Table 1 of Criterion 2.14a: Water quality parameters and their monitoring frequency, per type of culture system.

PARAMETERS	TYPE OF CULTURE SYSTEM					
	FRESHWATER			SEAWATER		
	Ponds	RAS	Flow-through	Ponds/Lagoons	RAS	Flow-through
Temperature	Twice a day	Twice a day	Twice a day	Twice a day	Twice a day	Twice a day
Dissolved oxygen	Twice a day	Twice a day	Twice a day	Twice a day	Twice a day	Twice a day
Turbidity	Daily (for intensive ¹⁶⁶ systems) Need based ¹⁶⁷ (for semi-intensive and extensive systems)	Daily	Daily	Daily (for intensive systems) Risk assessed (for semi-intensive and extensive systems)	Daily	Daily
Carbon dioxide	Biweekly (for intensive systems) Risk assessed (for semi-intensive and extensive systems)	Daily	Biweekly	Biweekly (for intensive systems) Risk assessed (for semi-intensive and extensive systems)	Daily	Biweekly
pH	Daily	Daily	Daily	Daily	Daily	Daily
Salinity	Risk assessed	Risk assessed	Risk assessed	Twice a day	Twice a day	Twice a day
Alkalinity	Risk assessed	Daily	Risk assessed	Risk assessed	Daily	Risk assessed
Ammonia	Daily	Daily	Daily	Daily	Daily	Daily
Nitrite	Weekly	Daily	Weekly	Weekly	Daily	Weekly
Nitrate	Biweekly	Daily	Biweekly	Biweekly	Daily	Biweekly
Metals	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed
Minerals (Ca ²⁺ , K ⁺ , Mg ²⁺)	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed
Hydrogen sulphide	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed	Risk assessed

Sub-criterion 2.14b – Fish Health and Welfare: Handling

Scope: Shrimp in grow-out

Indicator	Requirement
2.14b.1	<p>The site shall assess site-specific characteristics and develop a Shrimp Handling Management System (SHMS) accordingly. The site shall implement and monitor the SHMS for its effectiveness with the objective of ensuring good health and welfare of farmed animals. The SHMS shall include at least the following:</p> <ul style="list-style-type: none"> a) separate processes for each type of handling that may occur on the site i.e., live shrimp transfer inside the UoC or shrimp transfer for slaughter (including loading, transfer and unloading), and other procedures that may result in crowding. b) Contingency plans for processes described in 2.14b.1 a) in case of system failure, including at least the following: <ul style="list-style-type: none"> o Immediate emergency response. o Immediate emergency culling response measure following responsible stunning and killing according to 2.14c. o Mass mortality event response. c) Description and verification of the system²⁵ used e.g., live shrimp transport system. d) Suitable conditions necessary for handling; e.g., weather or tidal conditions. e) A fitness assessment²⁶ of the animals approved by a veterinarian or a fish health manager within a two-day period prior to the handling; in the case of serial, repeated handling, the fitness assessment should be carried out at least weekly. f) 98% survival rate to at least to one stress test before stocking in growth-out ponds. g) Pond preparation description and verification (e.g. newly constructed ponds or pond preparation after harvest) previous to stocking in grow-out enclosures. h) Acclimatisation measures previous to stocking in grow-out enclosures to avoid mortality due to sudden water parameters changes. i) Weight checks at every handling event j) Growth-out ponds release²⁷ conditions and verifications. k) Morphologic and behavioural verification immediately after transfer to grow-out enclosures, within some hours after transfer and the day after transfer as a minimum.

²⁵ System refers to any equipment, tools, or machinery being used during a particular handling operation. In requirement 2.15.1 d) The site shall describe the systems so a clear list of what is needed and of which specifications is available to anybody carrying out the procedure. In requirement 2.15.1 b) The site shall outline the process it will be carrying out.

²⁶ A fitness assessment shall include at least the revision of production data (e.g. feeding rates), the examination of random **healthy shrimp morphologic and behavioural parameters, and the examination of moribund and dead shrimp if present. In the context of this criterion morphologic parameters refers to size (including length uniformity), weight, occurrence of deformities, colour, muscle/gut ratio, gill and digestive system morphology. In the context of this criterion behavioural parameters refers to verification of swimming activity and poor or erratic swimming.**

²⁷ Shrimp shall be released in a small area of the pond “hapa” or net enclosures in the grow-out pond itself for a risk assessed period to evaluate the capacity of the PL to adjust to the pond conditions.

	<ul style="list-style-type: none"> l) Biosecurity measures specific to the type of handling, following the parameters in 2.14a.16 b), to avoid the transfer of disease, m) Predator control measures specific to the type of handling, following the parameters in 2.14a.16 c), to ensure the integrity of fish is maintained, n) Water quality monitoring and corrective actions in line with 2.14a.16.1, 5., 6., and 7., including at least the following: <ul style="list-style-type: none"> o Description of monitoring equipment o Monitoring frequency: prior to, during, and post handling. In the case of live shrimp transport, this means monitoring at the point of departure/arrival and during live fish transport unless this could cause detrimental impact. o Monitoring parameters; at least the temperature, pH, and oxygen level o) Visual inspection and corrective actions, in line with 2.14a.16, 3., 5., 6., and 7., including at least the following: <ul style="list-style-type: none"> o Visual inspection frequency: during handling o Visual inspection parameters: abnormal behaviour specific to the type of handling, p) Post-handling monitoring of fish and mitigation measures if necessary for: <ul style="list-style-type: none"> o Abnormal behaviour related to the handling event 2.14a.16 3., 5., 6., and 7.; o Compromised morphological scores related to the handling event 2.14a.16 2., 5., 6., and 7.; o Moribund fish related to the handling event (2.14a.5) o Mortalities related to the handling event (2.14a.4, 2.14a.6 and 2.14a.16 4., 5., 6., 7., and 8., q) A handling log, in the form of a recording template, which captures a)-o) for each handling event.
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Sub-criterion 2.14c – Fish Health and Welfare: Slaughter

Scope: Shrimp

Indicator	Requirement
2.14c.1	The UoC shall ensure all shrimp are stunned²⁸ prior to killing²⁹, by immersion in a controlled ice slurry bath or electrical device.
2.14c.2	The UoC shall ensure stunned shrimp lose sensibility immediately ³⁰ , and that insensibility persists until death sets in.
2.14c.2.1	The UoC shall ensure ice slurry is < 4 °C and at a 1:1 ratio of ice:shrimp.
2.14c.2.2	The UoC shall ensure shrimp are stunned effectively before use sodium metabisulfite for quality preservation.
2.14c.2.3	The UoC shall ensure electrical devices for stunning are used according to the manufacturers or suppliers' recommendations.

²⁸ Stunning methods can be irreversible or reversible. If irreversible, the stunning acts as the killing method at the same time.

²⁹ In other words, pre-slaughter handling must not lead to the death of shrimp, defeating the intention of using permitted killing methods; only live shrimp stunned are eligible for ASC certification.

³⁰ **Signs of sensibility vary between species but generally include resistance to handling, control of limb movements, eye reaction when the shell is tapped and reaction when touched around the mouth parts.**

2.14c.2.4	The UoC shall ensure that fish are stunned effectively ³¹ by assessing stunned shrimp for the absence of coordinated leg movement (verification of swimming leg), and general motion.
2.14c.4	The UoC shall not use the following methods to kill shrimp : <ul style="list-style-type: none"> - asphyxia in air, - CO₂, - salt baths, - ammonia baths, - drowning in freshwater (applicable only for saltwater shrimp), - boiling, or - dismemberment.
2.14c.5	The UoC shall ensure shrimp are killed effectively ³² by monitoring shrimp for the absence of coordinated leg movement (verification of swimming leg), and general motion.
2.14c.6	The UoC shall have immediate mitigation measures in place to respond to ineffective stunning or killing, including the presence of a back-up system such as extra ice or another electrical device.
2.14c.7	The UoC shall have a harvest log, in the form of a recording template, which captures all the harvest monitoring parameters above for each harvest event.

³¹ For this version of the standard, ASC considers a stunning efficiency of 95% (i.e., at least 95% of the shrimp stunned immediately lose sensibility) to be effective. **Checks shall be carried out on a minimum of 10 kg shrimp per harvest. 5 kg shrimp as startup checks and one extra point as a minimum to perform 10 kg.**

³² For this version of the standard, ASC considers a killing efficiency of 100% (i.e., at least 95% of the shrimp stunned and 100% killed) to be effective. **Checks shall be carried out on a minimum of 10 kg shrimp per harvest. 5 kg shrimp as startup checks and one extra point as a minimum to perform 10 kg.**

Criterion 2.16 - Veterinary therapeutants

Scope: Shrimp

Indicator	Requirement
2.16.1	The UoC shall only use therapeutants ³³ as prescribed and directed by a registered veterinarian.
2.16.2	The UoC shall not use hormones or antibiotics stimulating growth.
2.16.3	The UoC shall only use hormones (e.g. methyltestosterone or ethyl testosterone) for sex-reversal, to induce and coordinate spawning, or to produce single-sex stock. Each hormonal treatment shall be recorded.
2.16.4	The UoC shall not use antibiotics prophylactically ³⁴ .
2.16.5	The UoC shall retain prescriptions for each application of therapeutants - including the following minimum information: <ul style="list-style-type: none"> - the name, address and telephone number of the person prescribing the product; - the qualifications enabling the person to prescribe the product (e.g. relevant title or number of affiliation to a relevant veterinary college); - the name and address of the owner or keeper of the animals. - the identification (including the species) of the group of animals to be treated; - the premises at which the animals are kept if this is different from the address of the owner or keeper; - the date of the prescription; - the signature or other authentication of the person prescribing the product; - the name and amount of the product prescribed; - the reason to treat; - the dosage and administration instructions; - any necessary warnings; - the withdrawal period.
2.16.5.1	The UoC shall only use non-therapeutants³⁵ registered or approved by local regulations and as per suppliers recommendations/instructions
2.16.5.2	The UoC shall not use fermented probiotic bacterial strains to seed further probiotic batches.
2.16.5.3	The UoC shall keep records for each application of non-therapeutants including the following minimum information. <ul style="list-style-type: none"> - the name, address and telephone number of the manufacturer or supplier - the name and address of the owner or keeper of the animals. - the identification (including the species) of the group of animals applied non-therapeutants; - the premises at which the animals are kept if this is different from the address of the owner or keeper; - application period (date); - the name and amount of the product; - the dosage and administration instructions; - any necessary warnings.

³³ In the context of this criterion, therapeutants include antibiotics, antiparasitics, antifungals, antivirals, hormones, anaesthetics, and vaccines.

³⁴ The methaphylactic use of antibiotics is allowed.

³⁵ In the context of this criterion, non-therapeutants include but are not limited to, probiotics, prebiotics, phytobiotics, organic acids, enzymes, lysozymes, antimicrobial peptides, and bacteriophages.

2.16.5.4	The UoC shall not discharge any hazardous chemicals including treated water without previous neutralisation.
2.16.6	Indicator scope: every UoC using antibiotic treatments The UoC shall monitor for antibiotic resistance; this shall be done carrying out antibiotic sensitivity testing before or during each antibiotic treatment, or through regular monitoring of in-house strains ³⁶ .
2.16.7	Indicator scope: every UoC using antibiotic treatments The UoC shall monitor antibiotic treatment efficacy and investigate the causes behind any treatment failure ³⁷ .
2.16.8	Scope: every UoC using antiparasitic treatments except for salmonids in grow-out cages. The UoC shall monitor for antiparasitic resistance; this shall be done carrying out bioassays before or during each antiparasitic treatment, or through regular monitoring of in-house parasites ³⁸ . If no methods exist to determine resistance, then monitoring of treatment efficacy is sufficient.
2.16.9	Scope: every UoC using antiparasitic treatments except for salmonids in grow-out cages. The UoC shall monitor antiparasitic treatment efficacy and investigate the causes behind any treatment failure.
2.16.10	Scope: every UoC using antibiotic and antiparasitic treatments, except for salmonids in grow-out cages in the case of antiparasitic treatments. The UoC shall apply treatment rotation ³⁹ , if resistance has been determined in 2.16.7/19, or resistance is suspected as a cause of treatment failure in 2.16.8/20, and there is more than one effective antibiotic or antiparasitic available.
2.16.11	The UoC shall not use ⁴⁰ antimicrobials listed as Critically Important Antimicrobials for Human Medicine by the World Health Organisation (WHO), unless the following criteria are fulfilled: <ul style="list-style-type: none"> – the veterinarian or aquatic animal health professional has provided reasoning why the Critically Important Antibiotic is the only possibility⁴¹ for treatment – previous monitoring has not determined resistance to the active ingredient
2.16.12	The UoC shall adhere to species-specific limits on antibiotic ⁴² treatments (Annex 1).
2.16.13	The UoC shall adhere to species-specific limits on parasiticide treatments (Annex 1).

³⁶ In the case of bacterial infections that are reoccurring, the site might show evidence that work has been carried out to isolate the problematic bacterial strains, characterise them, and periodically (at least on a cycle basis) test them for antibiotic sensitivity.

³⁷ For this purpose, treatment failure is defined as persistent symptoms or signs of diseases, or continued detection of the infectious agent causing the diseases being treated. In many cases, this will be in the form of sustained mortality that does not decrease in response to treatment.

³⁸ In the case of parasitic infections that are reoccurring, the site might show evidence that work has been carried out to identify the problematic parasites, characterise them, and periodically (at least on a cycle basis) test them for antiparasitic resistance.

³⁹ In the context of this criterion, treatment rotation means using an active ingredient belonging to a different family of antibiotics or antiparasitics.

⁴⁰ Batches treated with antimicrobials listed as Critically Important Antimicrobials for Human Medicine are not eligible for ASC certification.

⁴¹ The only two accepted justifications are the following: resistance to all other available antibiotics, or no availability of other antibiotics than CIA.

⁴² Shrimp treated with antibiotics are no longer eligible for ASC certification.

2.16.14	The UoC shall reduce ⁴³ the antibiotic load ⁴⁴ per year or per production cycle ⁴⁵ . In the event of not meeting this indicator, the UoC shall demonstrate actions or measures taken to reduce antibiotic usage.
2.16.15	The UoC shall ensure that at the time of harvest, residue levels of therapeutants used are below the Maximum Residue Limits (MRL) as defined by all countries where the product is going to be sold or the limits set by the European Union.
2.16.16	The UoC shall comply with the withdrawal period of the country where the products are being sold.
2.16.17	The UoC shall have a risk-based residue testing plan in place to corroborate products are below MRL if needed.
2.16.18	The UoC shall, when resistance has been determined, disclose the finding to the ABM.
2.16.19	The site shall annually or within a month of concluding a production cycle publicly disclose: <ul style="list-style-type: none"> - the antibiotic load per production cycle or year. - use of antimicrobials listed as Critically Important Antimicrobials for Human Medicine by the WHO and the justification to use them.
2.16.20	The site shall annually report to ASC, according to Appendix 2 and using the template provided on the ASC website, the following: <ul style="list-style-type: none"> - the antibiotic load per production cycle or year, - use of antimicrobials listed as Critically Important Antimicrobials for Human Medicine by the WHO. - Full treatment records.
2.16.21	The UoC shall guarantee that in the case of a diseases outbreak, sick animals receive treatment or are humanely killed in the extend possible.

⁴³ This applies to UoCs dependent on the use of antibiotics i.e. where there is systematic use. The requirement to reduce antibiotic load or the number of treatments does not apply to UoCs with on-off use of antibiotics i.e. treatment after several years or production cycles without treatment.

⁴⁴ Antibiotic load is calculated as the sum of the antibiotic active ingredient (mg) divided by the sum of the harvested biomass (Kg). Where: mg of active ingredient is the sum of all the antibiotic treatments that have taken place in a farm during a production cycle or a year; Kg of harvested biomass is the total biomass harvested at the end of the production cycle or year. Reduction in antibiotic load shall be looked at by assessing the 6 years previous to the audit or the 6 previous cycles. For the first 6 audits comparison should only be done against one, two, three, four, or five years or production cycles previous to the audit. The target would be to decrease usage until a situation is reached where treatments are only sporadic (by sporadic ASC understands not happening every year or cycle).

⁴⁵ For farms with production cycles shorter than one-year or using continuous stocking/cropping methods - calculate per year. For farms with production cycles longer than one-year or using all-in-all-out stocking/cropping methods (e.g. salmon) - calculate per production cycle.