

Final report

Comparison of Australian and international air freight welfare requirements

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Abstract

This project examined Australian and international animal welfare regulatory requirements for cattle, sheep and goats transported by air, to determine the evidence base for the current standards, areas of regulatory non-alignment and the appropriateness of Australian standards from a risk management context.

The *Australian Standards for the Export of Livestock* (ASEL) sets animal welfare standards for livestock exported from Australia. *ASEL Standard 6 (Air transport of livestock)* has more detailed regulatory requirements than apply in any other international jurisdiction. However, many of the standards are based on experience with livestock transported by sea and do not address a significant animal welfare risk for livestock exported by air.

Regulatory best practice is about prudent risk management. Regulatory standards should target significant risks, be evidence-based, clearly defined, not unduly complex, not cause adverse or unintended side effects, not cause excessive or unnecessary compliance costs, and wherever possible should be aligned across the industry's domestic and international operations. They must also be enforceable.

This project provides 23 recommendations for changes to the ASEL standards for cattle, sheep and goats exported by air, to achieve animal welfare standards that are fit-for-purpose, with regulatory burden and economic consequences kept to a minimum.

There are also recommendations for changes to the International Air Transport Association *Live Animal Regulations*, to incorporate accepted best practice procedures for air transport of cattle, sheep and goats.

Executive summary

Background

Air freight is a small, highly specialised segment of the Australian livestock export industry.

Multiple standards apply to the export of Australian livestock by air. The *Australian Standards for the Export of Livestock* (ASEL) set animal welfare requirements for livestock exported from Australia. They apply throughout the live export supply chain, from animal selection in Australia to discharge overseas. ASEL is enforceable under Australian Commonwealth legislation. Compliance is mandatory.

The *International Air Transport Association Live Animal Regulations* (IATA LAR) provide guidance to IATA members on transportation of live animals on commercial aircraft. IATA LAR is intended as a reference and not for regulatory enforcement. However, compliance with IATA LAR is invariably a commercial requirement in the airline contract or charter agreement for the carriage of livestock.

Exporters may also be required to comply with animal welfare regulations in the country of destination and/or any countries the livestock transit en-route to their end destination.

The requirements of these standards vary, which makes compliance more difficult and adds to compliance costs. This project sought to establish the scientific basis for current animal welfare standards for livestock transported by air, and to identify opportunities to enhance animal welfare and/or streamline and harmonise Australian and international air freight welfare requirements.

Objectives

The objectives of this project were to:

- map the Australian and international animal welfare standards Australian licenced exporters are required to comply with when exporting cattle, sheep and goats by air;
- establish the scientific basis, if any, for the current animal welfare standards, with a scan of the scientific literature, research reports, industry reviews, critical incident reports, guidelines and codes of practice; and
- Identify opportunities to enhance animal welfare and/or reduce regulatory burden without compromising animal welfare, with changes to the standards Australian licenced exporters must comply with when exporting cattle, sheep or goats by air.

Methodology

This project involved:

- A scan of the scientific literature, research reports, industry reviews, critical incident reports, guidelines and codes of practice.
- A comparison of ASEL and international animal welfare requirements for cattle, sheep and goats exported by air.
- Identification of international requirements that are not currently in ASEL but would provide greater certainty for exporters and/or better manage animal welfare risks if included in ASEL.

- Developing recommendations including changes to ASEL and IATA LAR, so the standards target significant animal welfare risks for livestock transported by air, are evidence-based, practical, enforceable, and where possible there is harmony between Australian and international requirements.

Key findings

Expectations of 'good' regulation vary. In general, the Australian community expects animal welfare to be a prime consideration for the livestock export industry, with a high-performance bar and enforceable regulatory standards. A key policy driver for government is the need to avoid an animal welfare incident, or series of incidents, which rekindle community protests about the livestock export trade. Concern about the consequences of a welfare incident, and the need to protect both government and industry from community backlash, has encouraged government to adopt a strongly risk-averse approach to industry regulation. The livestock air freight export industry would like to operate as freely as possible, with consistently good animal welfare outcomes but without unnecessary or excessive restrictions, compliance costs or regulatory burden.

ASEL Standard 6 (*Air transport of livestock*) has more detailed regulatory requirements than apply in any other international jurisdiction. However, many of the requirements in ASEL Standard 6 are based on experience with livestock transported by sea and do not address a significant animal welfare risk for livestock exported by air. This places Australian livestock air freight exporters at a commercial disadvantage relative to their overseas competitors, for little if any animal welfare benefit.

LIVEXCollect end-of-journey reporting requirements are also ASEL requirements. The LIVEXCollect end-of-journey report for air freight has largely been derived from the daily and end-of-voyage reports for livestock exported by sea. It is not 'fit-for-purpose' for air freight. Much of the data required is not relevant to air freight and there is no reasonable prospect of interpreting the data in a meaningful way.

With modest changes to ASEL and LIVEXCollect, there is considerable scope to reduce regulatory burden and costs without compromising animal welfare.

Benefits to industry

The Department of Agriculture, Fisheries & Forestry has committed to undertaking a regular review of the ASEL standards, to ensure they are fit for purpose, based on science and regulatory best practice. This project provides a strong case for change, resulting in a significantly reduced regulatory burden, without compromising animal welfare.

Future research and recommendations

The next phase for this report is advocacy by the industry, to fast track a review of the ASEL standards and LIVEXCollect reporting requirements for livestock exported by air. Also advocacy for IATA to incorporate accepted best practice procedures for air transport of cattle, sheep and goats in the next *IATA Live Animal Regulations* update.

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1. Background

Multiple live export standards currently apply when a licenced exporter consigns Australian livestock for export by air. These standards are principally:

- the *Australian Standards for the Export of Livestock* (Department of Agriculture, Water and the Environment, 2021);
- the *International Air Transport Association Live Animals Regulations* (International Air Transport Association, 2021); and
- the World Organisation for Animal Health *Terrestrial Animal Health Code Chapter 7.4 (Transport of Animals by Air)* (OIE, 2021).

A licenced exporter must also comply with relevant State and Territory laws, regulations, standards and guidelines relating to the health, welfare, husbandry and transport of animals in their care. Importing country requirements relevant to the export consignment must also be met.

The standards that apply when Australian livestock are exported by air have common elements, but there are also significant differences, which make compliance more challenging, with increased animal welfare risks and compliance costs.

This project was commissioned by the LEP RD&E Program to identify opportunities to update and standardise the animal welfare regulations that apply when Australian livestock are exported by air, with clear enforceable standards that address genuine welfare risks.

2. Objectives

Regulatory best practice is about risk management. Regulatory standards should target significant risks, be evidence-based, clearly defined, not unduly complex, not cause adverse or unintended side effects, not cause excessive or unnecessary compliance costs, and be in harmony across the industry's domestic and international operations. They must also be enforceable.

This project examines Australian and international air freight animal welfare regulatory requirements to determine the evidence base for current standards and regulations, areas of regulatory non-alignment, and the appropriateness of current Australian standards in a risk management context.

3. Methodology

3.1. Key elements

This review has four key elements:

- **A scan of the scientific literature, research reports, industry reviews, critical incident reports, guidelines and codes of practice** – to identify where livestock air transport regulations are based on sound scientific evidence, and where current requirements are empirical and/or based on experience in settings other than air freight.
- **A comparison of ASEL and international requirements** - to determine where Australian and international livestock air transport requirements are aligned, where there is mal-alignment, and where there is no alignment.
- **Identification of international requirements that are not currently in ASEL** but would provide greater certainty for exporters and/or better manage animal welfare risks if included in ASEL.
- **Recommendations** - changes to ASEL and IATA Live Animal Regulations, so the standards target significant animal welfare risks for livestock transported by air, are evidence based, practical, enforceable, and where possible there is harmony between Australian and international requirements. Each suggested amendment to ASEL has a short assessment of the likely economic and animal welfare consequences of the proposed change.

3.2. Out of scope

This review does not consider:

- animal welfare standards for species other than cattle, sheep and goats.
- export standards not directly related to animal welfare, such as livestock traceability, food safety and chemical residue requirements.
- importing country protocol requirements.
- airline specific restrictions and regulations.
- animal welfare standards at an approved premises where livestock are prepared for export by air.
- inspection procedures and criteria to assess fitness to export.

4. Results

4.1. Industry overview

Air freight is a small, highly specialised segment of the Australian livestock export industry. During the last five years (2017-2021):

- Less than 1% of the cattle exported from Australia were exported by air. Most were high-value dairy breeders, exported to a wide range of destinations in Asia and the Middle East.
- About 3% of the sheep exported from Australia were exported by air. The majority were slaughter sheep exported to Malaysia and Singapore. However, there were also many small consignments of breeding sheep exported to markets around the globe.
- All the goats exported from Australia were exported by air, with roughly equal numbers of slaughter and breeding goats. All were exported to the Asia-Pacific region, with Malaysia and Sabah/Sarawak the major markets.

Table 1 - Cattle, sheep and goats exported by sea and air (2017-2021)

	Cattle	Sheep	Goats
Exported by sea	5,073,972	5,396,526	-
Exported by air	44,074	172,450	71,366
Total exports	5,118,046	5,568,976	71,366
% Exported by air	< 1 %	3 %	100 %

Source: Department of Agriculture, Fisheries and Forestry

Table 2 – End use of cattle, sheep and goats exported air (2017-2021)

	Cattle	Sheep	Goats
Breeder	42,878	28,386	35,997
Slaughter	1,196	144,064	35,369

Source: Department of Agriculture, Fisheries and Forestry

Table 3 – Destinations for cattle, sheep and goats exported by air (2017-2021)

Destination	Cattle	Sheep	Goats
Argentina	-	44	-
Bangladesh	345	157	136
Brunei Darussalam	-	6,652	-
Cambodia	568	-	-
Canada	4	17	-
Chile	-	6	-
China	538	7,932	11,885
India	-	900	-
Indonesia	5,779	595	841
Japan	9,216	209	-
Kazakhstan	2,471	75	25
Kyrgyzstan	-	103	-
Malaysia	13,814	135,727	36,756
Nepal	-	-	790
New Zealand	-	147	33
Philippines	1,515	2,936	6,005
Russia	-	983	125
Sabah / Sarawak	928	1,485	12,693
Singapore	-	11,772	35
Sri Lanka	371	-	100
Taiwan	5,547	150	36
Thailand	1,057	53	407
United Arab Emirates	717	327	1,139
United Kingdom	-	22	-
Uruguay	-	8	-
Uzbekistan	-	2,100	-
Vietnam	1,204	50	360

Source: Department of Agriculture, Fisheries and Forestry

Australian cattle, sheep and goats are exported by air:

- on ‘livestock charter’ freighter aircraft, where the aircraft’s cargo capacity is fully committed to livestock and the flight destination, route and time is customised to the specific consignment; and
- on scheduled freighter aircraft, with other (non-livestock) freight; and
- in a lower cargo hold of a passenger aircraft.

Air freight enables an exporter to deliver Australian cattle, sheep and goats around the globe – in most cases within 24 hours of loading in Australia. However, transporting livestock by air presents some unique challenges. Exporting livestock in crates, in an aircraft hold, is very different from exporting them by sea. Many of the welfare concerns for livestock exported by sea are of little if any relevance for air transport.

The cost of air freight, short delivery time and high-value market segments supplied with livestock by air provide a strong incentive for Australian exporters to deliver animals that are in good health and fit-for-purpose. Commercial imperatives address most of the animal welfare risks associated with animal type, preparation for export and fitness to travel.

The welfare risks for livestock exported by air are mostly related to ventilation during the flight, including transit stops. Ensuring adequate dispersion of the heat, moisture and noxious gases generated by the animals on board is critically important.

Table 4 shows the number of mortalities for cattle, sheep and goats exported by air over the five-year period 2017-2021. There are very few mortalities.

Table 4 – Mortalities for cattle, sheep and goats exported by air

Year		Cattle	Sheep	Goats
2017	Exports	9,261	42,147	12,245
	Mortalities	0	16	2
2018	Exports	11,646	32,543	22,644
	Mortalities	0	4	11
2019	Exports	11,466	41,505	16,059
	Mortalities	0	5	4
2020	Exports	6,411	33,683	8,400
	Mortalities	1	3	1
2021	Exports	5,290	22,572	12,018
	Mortalities	0	1	2
Total 2017-2021	Exports	44,074	172,450	71,366
	Mortalities	1	29	20
	Delivery rate	> 99.99%	> 99.98%	> 99.97%

Source: Department of Agriculture, Fisheries and Forestry

ASEL 3.2 defines a mortality ‘notifiable incident’ for livestock exported by air as shown in Table 5. There has not been a notifiable mortality incident for Australian livestock exported by air since August 2015.

Table 5 – Notifiable mortality level for livestock transported by air

Mortalities per flight	
Cattle	0.5% or 3 animals, whichever is greater
Sheep	1% or 3 animals, whichever is greater
Goats	1% or 3 animals, whichever is greater

4.2. What standards apply internationally?

4.2.1. Australian Standards for the Export of Livestock

The *Australian Standards for the Export of Livestock* (ASEL) sets the minimum animal welfare requirements for livestock exported from Australia. The ASEL standards cover cattle, sheep, goats, buffalo, deer and camelids exported by sea or air. They apply throughout the live export supply chain, from animal selection in Australia to discharge overseas.

ASEL has regulatory standing and is enforceable under the *Export Control Act 2020* and the *Export Control (Animals) Rules 2021*. Compliance with ASEL is mandatory. It is a condition for holding a licence to export Australian livestock, and an operational requirement to obtain a permit to export each consignment.

ASEL has six separate sections. Standards 1-5 regulate livestock exports by sea. Standard 6 covers livestock exports by air. Many of the requirements in Standard 6 (*Air transport of livestock*) are the same as, or very similar to, those for livestock exported by sea.

ASEL has detailed requirements regarding livestock selection for export by air, and less emphasis on air freight as the means of transport. There are standards for body condition score and horn length, shape and spread for animals exported by air, but not standards for aircraft crate design or environmental monitoring during the flight, despite these being key factors affecting animal welfare.

ASEL includes a requirement that livestock exported by air must be exported in compliance with the IATA *Live Animal Regulations* (ASEL Standard 6.1.13), but with a caveat that if there is a variance between IATA and ASEL, the ASEL standards apply.

ASEL Standard 6 (*Air transport of livestock*) has more detailed regulatory requirements than which apply in other international jurisdictions. However, many of the requirements in ASEL Standard 6 are based on experience with livestock transported by sea and do not address a significant animal welfare risk for livestock exported by air. This places Australian livestock air freight exporters at a commercial disadvantage relative to their overseas competitors, for little if any animal welfare benefit.

A literature review of scientific research relating to animal health and welfare in livestock exported by air identified few relevant peer reviewed publications, with insights to the management and risks for exported livestock largely derived from industry-funded research projects and unpublished industry reports (Collins et al. 2019). This literature review was a key source document for a review of ASEL in 2020 (Department of Agriculture 2019, Department of Agriculture, Water and the Environment 2019).

The current version of ASEL is ASEL 3.2. It was released in 2021, with minor amendments from the previous version, intended to reduce ambiguity and improve readability and usability. The 2021 ASEL update did not address industry or community concerns that are more complex and/or might have a large regulatory impact. The next ASEL review is expected to be more comprehensive. Issues of relevance to livestock exports by air flagged for consideration at the next ASEL review include reporting requirements, environmental monitoring and the role of aircraft stock attendants.

4.2.2. IATA Live Animal Regulations

The International Air Transport Association (IATA) is the international trade association for the airline industry. It represents the interests of about 290 airline members from 120 countries around the globe. The major international airlines are all IATA members.

IATA has a comprehensive suite of standards covering aviation safety, security and airline operations. IATA's *Live Animal Regulations* is the standard for transporting live animals on commercial aircraft. It covers a wide range of species - domestic pets, livestock, wildlife, laboratory animals, marine mammals, reptiles, birds, crustaceans, fish and insects. The focus is on safe handling of individual animals and small consignments, rather than full freighter loads of livestock.

IATA LAR has animal container specifications and recommended stocking densities, information about container labelling and documentation and recommendations regarding management of animals while they are in the care of IATA member airlines. With some minor exceptions, such as pregnancy status, IATA LAR does not cover selection of animals for export by air, pre-export preparation or inspection of animals for fitness to travel prior to loading.

Container requirements (which include aircraft crates, pens and stalls) are set out in Chapter 8 of IATA LAR. There are 'General' requirements for various groups of animals and 'Specific' requirements for particular species. There are line drawings of crates suitable for livestock, but the illustrations are only examples, so crate design may differ from those shown.

IATA LAR gives advice about temperature ranges for some species in Appendix C, and about animal heat and moisture load in Appendix D.

IATA is not a regulatory body, but its airline members are expected to comply with IATA LAR. Member airlines may set requirements for the carriage of live animals in addition to those in IATA LAR.

Third parties who consign animals on IATA member airlines are also expected to comply. IATA LAR 1.1 states ... *'Shippers who ship live animals by the above airlines, whether as cargo or as baggage, must comply with the IATA Live Animal Regulations in their entirety, as well as any (additional) government regulations which apply in the state of origin, transit and destination.'*

IATA LAR is not intended to be used for regulatory enforcement. However, compliance with IATA LAR is invariably a commercial requirement in the contract of carriage or aircraft charter agreement for livestock.

IATA LAR is updated annually, in both electronic and print format, in English, French and Spanish languages. The current edition is LAR 48, which applies from 1 January to 31 December 2022.

4.2.3. OIE Terrestrial Animal Health Code

The World Organisation for Animal Health (OIE) is an inter-governmental organisation with 182 member countries, including Australia. Its charter includes the collection, analysis and dissemination of veterinary scientific information, and the publication of international standards for animal health and welfare.

The OIE *Terrestrial Animal Health Code* (TAHC) is the global standard for terrestrial animal health and welfare and veterinary public health. Chapter 7.4 contains standards for *Transport of Animals by Air* (OIE, 2021).

The *Terrestrial Animal Health Code* has animal container design and ventilation specifications, recommended stocking densities and maximum stages of pregnancy for livestock transported by air. The Code also has standards for preparing animals for air transport, euthanasia, use of tranquilisers, disinfection, disinsection and food and waste handling and disposal.

The OIE is not a regulatory body and member countries are not obliged to legislate compliance with the *Terrestrial Animal Health Code*. Rather, the Code is a guide for member countries, promoting animal health and welfare with a consistent, internationally recognised, science-based approach.

4.2.4. European Union

EU *Regulation 1/2005 On the protection of animals during transport and related operations* sets out the requirements for transport of animals in EU member countries (European Union, 2004). As a 'Regulation', it is a binding legislative act that must be applied in its entirety across the European Union. EU *Regulation 1/2005* became applicable in all EU member states with effect from 5 January 2007.

EU *Regulation 1/2005* covers the transport of live animals by road, rail, sea and air. It describes the obligations for people with responsibility for animal care, and provides generic standards across the transport chain, covering initial planning and preparation to travel, assessment of fitness to travel, animal handling facilities, minimum pen area requirements, management procedures, staff training, documentation and regulatory oversight.

There are two small sections in *EU Regulation 1/2005* dedicated specifically to livestock transported by air.

- Annex 1, Chapter 2, paragraph 4 states 'Animals shall be transported in containers, pens or stalls appropriate for the species, which comply with the International Air Transport Association (IATA) Live Animal Regulations.'
- Annex 1, Chapter 7 (*Space allowances*) sets the minimum pen area requirements for cattle, sheep and goats exported by air.

Each EU member country is responsible for implementing *EU Regulation 1/2005* within its national jurisdiction. An Implementation Assessment of *EU Regulation 1/2005* by the European Parliamentary Research Service in 2018 found significant differences in compliance and enforcement between member states (European Parliamentary Research Service 2018).

4.2.5. USA

The Animal and Plant Health Inspection Service (APHIS) of the USA Department of Agriculture (USDA) regulates the export of live animals and animal germplasm. The regulations are codified in Title 9 of the Code of Federal Regulations (CFR), part 91, '*Exportation of Live Animals, Hatching Eggs or Other Embryonated Eggs, Animal Semen, Animal Embryos, and Gametes from the United States.*'

A Program Handbook: Exportation of Live Animals, Hatching Eggs and Animal Germplasm from the United States sets out the practical requirements for livestock exports (Animal and Plant Health Inspection Service of the United States Department of Agriculture 2021). It covers pre-export isolation facilities and their management, pre-export inspection, ocean vessel design and operations at sea; and the use of disinfectants.

There is a small section in the APHIS Program Handbook devoted specifically to livestock exported by air – Appendix II (*Cargo Containers for Livestock Shipped by Air*). It references IATA LAR for guidance regarding cargo containers.

Appendix II in the Program Handbook also has tables listing the minimum pen area per head for cattle, sheep and goats. The tables use imperial measures – lbs liveweight and ft²/head, but with the same liveweight reference points and minimum pen areas per head as IATA LAR.

4.2.6. Transit and transshipment

Australian livestock transiting or being transhipped through an overseas country must comply with the animal welfare, biosecurity and other relevant regulations in the overseas jurisdiction. For example: Australian livestock transiting or transhipped through New Zealand must comply with New Zealand requirements.

4.3. What should animal welfare standards for the industry look like?

4.3.1. Community expectations

In the 1990s and early 2000s, animal welfare in the livestock industries focused on the ‘Five freedoms’, which were widely recognised as the foundation of good animal welfare practice. They were freedom:

- from hunger, thirst and malnutrition
- from discomfort and exposure
- from pain, injury and disease
- from fear and distress; and
- to express normal behaviour.

In practice, ‘freedom from’ was generally interpreted to mean ‘as free as practical from’. The five freedoms were essentially a check list to help identify management procedures and environmental conditions with poor welfare consequences and encourage change to reduce (but not necessarily eliminate) adverse animal welfare outcomes. Current animal welfare guidelines and codes of practice for the Australian livestock industries are largely based on the ‘Five freedoms’ concept.

Animal welfare science has since evolved, with the ‘Five freedoms’ replaced by the ‘Five domains’. The frameworks are similar, but while the ‘Five freedoms’ focus on physical things, the ‘Five domains’ also consider factors such as mental and emotional wellbeing in an animal’s overall welfare state (Mellor 2016, Mellor 2017). This has led to the concept of an animal needing positive enrichment, to provide ‘a good life, worth living (Mellor and Beausoleil 2015).

The OIE Terrestrial Animal Health Code Animal Welfare states ... *‘Animal welfare means the physical and mental state of an animal in relation to the conditions in which it lives and dies. An animal experiences good animal welfare if the animal is healthy, comfortable, well nourished, safe, is not suffering from unpleasant states such as pain, fear, and distress and is able to express behaviours that are important for its physical and mental state’* (OIE 2021).

Animal rights groups tend to regard the rights of farmed animals like human rights, with intensive animal husbandry and confinement a form of exploitation. Animal welfare groups and the community in general

have a more moderate approach, accepting that livestock will continue to be farmed commercially, but expecting animal welfare to be a key consideration in their husbandry.

A large-scale survey of community sentiment, commissioned by LiveCorp in 2020, and repeated in 2022, found that Australians see regulation, standards of practice, auditing and holding the live export industry accountable as very important (Voconiq 2020, Voconiq 2022). Community values must be addressed in a proactive way to protect the industry's social licence to operate (Coleman 2018).

An 'Animal welfare indicators' project for sheep and cattle exported by sea was developed in response to this sentiment, and to the realisation that the industry's social licence to operate required a consideration of animal welfare well beyond mortality rate (Collins et al. 2021, Fleming et al. 2020, Wickham et al. 2017). However, assessing an animal's mental and emotional wellbeing is subjective and very difficult to encompass in practical regulatory standards.

4.3.2. Government requirements

The overwhelming policy driver for government is the need to avoid an animal welfare incident or series of incidents which ignite negative public sentiment and rekindle community protest. Concern about the political consequences of a welfare incident and need to protect both government and industry from community backlash has generated a strongly risk-averse approach to industry regulation. This is reflected in the detail and prescriptive nature of the *Australian Standards for the Export of Livestock*.

The Commonwealth Office of Best Practice Regulation (OBPR), a unit within the Department of Prime Minister and Cabinet, provides a framework for regulatory best practice by Commonwealth departments (Department of the Prime Minister and Cabinet 2021). The key principles of good regulatory practice set out by the OBPR, and agreed by the Council of Australian Governments (COAG), are as follows:

1. Establishing a case for action before addressing a problem.
2. A range of feasible policy options must be considered, including self-regulatory, co-regulatory and non-regulatory approaches, and their benefits and costs assessed.
3. Adopting the option that generates the greatest net benefit for the community.
4. Legislation should not restrict competition unless it can be demonstrated that:
 - a. the benefits of the restrictions to the community as a whole outweigh the costs, and
 - b. the objectives of the regulation can only be achieved by restricting competition.
5. Providing effective guidance to relevant regulators and regulated parties in order to ensure that the policy intent and expected compliance requirements of the regulation are clear.
6. Ensuring that regulation remains relevant and effective over time.
7. Consulting effectively with affected key stakeholders at all stages of the regulatory cycle.
8. Government action should be effective and proportional to the issue being addressed.

Given community concerns about animal welfare in the livestock export trade, and the reputational damage to Australia caused by an animal welfare critical incident, there is a compelling case for a suite of regulatory standards to manage animal welfare risks in the livestock export trade. However, ASEL 3.2 has standards which address issues where there is minimal if any animal welfare risk, the evidence base for the standard is scant, and/or expected compliance requirements are not clear or are not enforceable. There

are also areas where ASEL 3.2 could be enhanced with new or amended standards that focus on areas of particular animal welfare risk.

The Department of Agriculture, Fisheries and Forestry (DAFF) has committed to undertaking a regular review of the ASEL standards, to ensure they are fit-for-purpose, based on science and regulatory best practice. This project should provide valuable source material for the next review of the ASEL standards for livestock exports by air.

4.3.3. Industry requirements

The livestock air freight export industry (licenced exporters, air freight forwarders and airlines) need ASEL standards to protect the industry from export operations with greater risk – new entrants to the industry who do not have the expertise and/or resources to consistently achieve good animal welfare outcomes, and established export operations who for commercial gain are prepared to take risks that are not acceptable to the industry at large.

From an industry perspective, the ASEL standards need to manage significant animal welfare risks, but otherwise allow the industry to operate freely, without unnecessary restrictions, compliance costs or regulatory burden.

The ASEL standards need to have clear compliance requirements, no adverse or unintended side effects, and wherever possible be in harmony across the spectrum of industry operations – domestic and international.

4.4. Comparison of ASEL and international standards

The tables that follow compare ASEL 3.2 Standard 6 (Air transport of livestock) requirements with IATA Live Animal Regulations 48 and the OIE Terrestrial Animal Health Code Chapter 7.4 (Transport of Animals by Air). The ASEL standards are listed in the order they occur in ASEL 3.2, and not in order of priority or consequence. They are followed by tables comparing ASEL reporting requirements embedded in LIVEXCollect with international requirements.

ASEL Standard 6.11.2 states ... *The exporter must ensure that an end-of-journey report is provided to the department within 5 days of completion of unloading at the final airport of disembarkation. The end-of-journey report must be in a form provided on the department's website and include all the information required in the form.* The department's website states that LIVEXCollect must be used for submission of end-of-journey reports. As a result, LIVEXCollect end-of-journey reporting requirements are also ASEL requirements.

Table 6 - Comparison of ASEL 3.2 and international requirements for livestock exported by air

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.9 <i>The maximum water deprivation time and minimum rest times specified for each species and class of animal equal to those set out in the Land Transport Standards must be adhered to. Water deprivation time begins at the time animals are curfewed prior to transport to the airport and calculations must include the time until the point animals are provided water again. Exporters must have a plan for managing water deprivation time and keep records (expected and actual water deprivation time) for at least 2 years after the date of export.</i></p>	<p>IATA LAR and OIE TAHC do not specify maximum water deprivation times or minimum rest times for livestock transported by air.</p> <p>IATA LAR recommends species that require water during air travel, but those species do not include cattle, sheep or goats.</p>	<p>The Land Transport Standards (Animal Health Australia 2012) were based on the scientific knowledge and recommended industry practices at the time of development, after extensive industry and community consultation.</p> <p>The Land Transport Standards have been incorporated into the animal welfare legislation in all Australian States and Territories.</p> <p>A literature review of feed and water curfews for livestock transport in Australia (Pethick 2006) recommends maximum water deprivation times aligned with those in the Land Transport Standards.</p> <p>Std 6.1.9 simply extends Australian domestic land transport requirements until animals exported by air have access to water and are rested overseas.</p> <p>The requirement to keep a record of expected and actual water deprivation time for at least two years after the date of export is additional to what is required in the Land Transport Standards.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.11 <i>For livestock that are en-route or at airport but required to return to an approved premise or other premises:</i></p> <p>a) <i>in addition to any requirements under the Land Transport Standards:</i></p> <p>i. <i>if the journey from premises departure to premise return exceeds 6 hours, the livestock must be unloaded, fed, watered, and rested for a minimum of 12 hours prior to being reloaded for transport; or</i></p> <p>ii. <i>if the journey from premises departure to premise return exceeds 12 hours, the livestock must be unloaded, fed, watered, and rested for a minimum of 24 hours prior to being reloaded for transport; and</i></p> <p>b) <i>the exporter must keep records of animal movements, time off food and water, and rest periods, and retain these for at least 2 years after the date of export.</i></p>	<p>IATA LAR and OIE TAHC do not specify maximum water deprivation times or minimum rest times for livestock transported by air.</p>	<p>Std 6.1.9 requires compliance with the water deprivation and rest times in the Land Transport Standards. If the Land Transport Standards are met, the benefits of the additional requirements in Std 6.1.11 (a) are not obvious.</p> <p>Std 6.1.11 was not present in ASEL 2.3 (Department of Agriculture, Fisheries and Forestry 2011). It was introduced when ASEL was updated to ASEL 3.0. The Technical Advisory Committee reviewing ASEL thought additional feed, water and rest for livestock returned to an approved premises or alternative property was desirable but did not provide compelling evidence or a case study demonstrating a welfare risk to animals that otherwise complied with the Land Transport Standards.</p> <p>Livestock returned from the airport to an approved premises or alternative property because of delayed loading is a rare event. A significant delay after the airline has confirmed aircraft arrival and load time may occur for a variety of reasons and be of uncertain duration. In these circumstances, the flexibility to leave animals on the truck, return them to an approved premises, or unload them somewhere close to the airport, with the approval of the Department’s supervising veterinarian, and without the fear of further enforced delay, is likely to give the best animal welfare and commercial outcome.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (a) <i>When calculating pen space allocation and penning livestock:</i></p> <p>a) <i>accurate final weights of livestock must be obtained in view of the weight limitations imposed by the load capabilities of the aircraft and the space required per animal.</i></p>	<p>IATA LAR and OIE TAHC have similar wording:</p> <p>IATA LAR 8.2.1 <i>When calculating stocking density the following variables must be taken into account:</i></p> <ul style="list-style-type: none"> <i>it is essential that accurate weights of animals are obtained in view of the weight limitations imposed by the load capabilities of the aircraft and the space required per animal.</i> <p>OIE TAHC 7.4.3 <i>When calculating stocking rates the following should be taken into account:</i></p> <ul style="list-style-type: none"> <i>it is essential that accurate weights of animals are obtained in view of the weight limitations imposed by the load capabilities of the aircraft and the space required per animal.</i> 	<p>ASEL Std 6.1.14 (a) is closely aligned with IATA LAR and OIE TAHC requirements.</p> <p>An accurate gross weight of each crate is essential for safe loading and operation of the aircraft.</p> <p>Knowing the number and accurate weight of animals in each crate is essential for compliance with stocking density standards.</p> <p>It is standard industry practice to record the tare and gross weight of each crate loaded with livestock.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (b) <i>When calculating pen space allocation and penning livestock:</i></p> <p>b) <i>where the number of animals per crate calculated is not a whole number, decimal point 4 and below must be rounded down. Decimal point 5 and above can be rounded up if the resulting space allocation does not exceed a 5% decrease from minimum requirements.</i></p> <p>Note: An Excel spreadsheet on the Department’s website provides a convenient method of determining how many animals may be loaded into a crate, with a lower risk of error than with manual calculation.</p>	<p>IATA LAR and OIE TAHC do not specify how the maximum number of animals per crate should be determined if the calculated number is not a whole number.</p> <p>IATA LAR 8.2.2 has a Calculation Table which shows the number of animals of various weights that can fit in single tier pallets of different sizes.</p> <p>OIE TAHC 7.4.3 has an identical table.</p> <p>Unfortunately, the table has limited weight reference points and it is not possible to establish a pattern of rounding up or down.</p>	<p>ASEL 3.0 stated that ... ‘<i>where the number of animals per pen calculated is not a whole number, decimal point 7 or below must be rounded down</i>’.</p> <p>This was changed to the current wording when ASEL was updated to ASEL 3.2.</p> <p><i>The Review of the Australian Standards for the Export of Livestock: Air transport</i> (Department of Agriculture, Water and the Environment 2019) provides the rationale for rounding up from point 5 rather than point 8, provided the resulting space allocation does not exceed a 5% decrease from minimum requirements.</p> <p>Pen area allocation is critical to both animal welfare and the economics of exporting livestock by air. Animals confined in an aircraft crate must be stocked densely enough to provide mutual support, to reduce the risk of injury at take-off, during turbulence and at landing, but there must also be enough space for animals to lie down and get up without risk of injury or crushing.</p> <p>Overloading is a key animal welfare risk factor with livestock road transport. However, loading too loosely also increases bruising and injury risk (Animal Health Australia 2012, Strappini et al. 2009; Wythes et al. 1985)</p> <p>Std 6.1.14 (b) is a considered attempt to enhance commercial outcomes without compromising animal welfare.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (c) <i>When calculating pen space allocation and penning livestock:</i></p> <p>c) <i>the livestock must be able to stand normally, and once lying down should be able to regain their feet unaided and without undue interference from other animals.</i></p>	<p>IATA LAR and OIE TAHC have similar wording:</p> <p>IATA LAR 8.2.1 <i>Animals confined in groups, especially in pens, must be stocked at a density high enough to prevent injuries at take-off, during turbulence and at landing, but not to the extent that individual animals cannot lie down and rise unaided without risk of injury or crushing.</i></p> <p>OIE TAHC 7.4.3 <i>Animals confined in groups, especially in pens, should be stocked at a density high enough to prevent injuries at take-off, during turbulence and at landing, but not to the extent that individual animals cannot lie down and rise unaided without risk of injury or crushing.</i></p>	<p>ASEL Std 6.1.14 (c) is closely aligned with IATA LAR and OIE TAHC requirements.</p> <p>The Land Transport Standards have a similar requirement for livestock transported in Australia. LTS GA3.6 states ... <i>The livestock crate should be designed to ensure that livestock can rise from lying in a normal manner without contacting overhead deck structures.</i></p> <p>Compliance with the minimum aircraft crate pen area tables in ASEL should allow livestock to stand normally and once lying down rise unaided without risk of injury or crushing. Std 6.1.14 (c) seems unnecessary.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (d) <i>When calculating pen space allocation and penning livestock:</i></p> <p>d) <i>when livestock stand normally, no part of the animal's body (including horns) must touch any overhead part of the crate including any supporting crossbars.</i></p>	<p>IATA LAR Container Requirement 3 (Applicable for the bulk movement of cattle, sheep and goats). <i>The animals must be able to stand up in a natural position. It is recommended that 10 cm overhead space is provided for small livestock and 20 cm for large stock. And ... For cattle 20 cm over the shoulder or loin, whichever is the highest.</i></p> <p>IATA LAR Container Requirement 74 (Applicable for sheep and goats in multiple or single animal crates). <i>A minimum clearance over the head or tip of the horn of 7.5 cm (3 in) is required for sheep and goats.</i></p> <p><i>Note:</i> The overhead space required for sheep and goats in IATA LAR is not consistent, with 10 cm recommended in CR 3 and 7.5 cm recommended in CR 74.</p> <p>OIE TAHC 7.4.1 <i>The container should allow the animal to stand in its normal position without touching the roof of the container or, in the case of open containers, the restraining nets, and provide at least 10 cm clearance above the animal's head when standing in its normal position.</i></p>	<p>The intent of Std 6.1.14 (d) is consistent with IATA LAR and OIE TAHC requirements – avoiding animal contact with the crate roof and/or cargo net.</p> <p>The words ‘stand normally’ and standing in a ‘natural position’ are ambiguous, as the ‘normal’ or ‘natural’ position’ for a grazing animal could be interpreted as head down or head up.</p> <p>ASEL would be more closely aligned with IATA LAR, and there would be greater clarity of requirements, if ASEL was amended to require clearance above the shoulder or loin, whichever is highest, of least 10 cm for sheep and goats and at least 20 cm for cattle.</p> <p>The minimum overhead clearances recommended in IATA LAR and suggested for inclusion in ASEL are empirical rather than evidence based. Some objective research in this area would be useful.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (e) <i>When calculating pen space allocation and penning livestock:</i></p> <p>e) <i>expected ambient temperatures and ventilation capacity at loading, transits, transhipments and unloading must be taken into account.</i></p>	<p>IATA LAR 8.2.1 <i>When calculating stocking densities the following variables must be taken into account:</i></p> <ul style="list-style-type: none"> - <i>ambient temperatures in relation to the ventilation capacity of the aircraft at loading and stopovers.</i> <p>OIE TAHC 7.4.4 <i>Animals are affected by extremes of temperature. This is especially true of high temperature when compounded by high humidity. Temperature and humidity should therefore be taken into consideration when planning the shipment.</i></p>	<p>Environmental control on an aircraft is critically important to the wellbeing of the livestock on board (Hogan and Binns 2010, Le 2012, Marosszéký 2009, SAE Aerospace 2015).</p> <p>Ventilation failure has been the cause of every reportable air freight livestock mortality notifiable incident since 2008.</p> <p>Std 6.1.14 (e) is well meaning and consistent with similar wording in IATA LAR and OIE TAHC. However, it is poorly crafted regulation, as temperature and ventilation capacity concerns are not clearly specified, nor what action an exporter is expected to take to mitigate risks or what outcome is required.</p> <p>Std 6.1.14 (e) is unenforceable.</p>
<p>Std 6.1.14 (f) and (g) <i>When calculating pen space allocation and penning livestock:</i></p> <p>f) <i>livestock must be penned with animals of the same species, class, sex and of a similar weight (note: castrated males may be penned with females however entire males must be penned separately).</i></p> <p>g) <i>where animals of unequal size are placed in the same crate, the crate must be divided so that they are penned separately.</i></p>	<p>IATA LAR and OIE TAHC do not specify how different lines of livestock should be drafted and penned in aircraft crates.</p>	<p>Penning animals into aircraft crates by species, class, sex and weight is accepted industry best practice (Brightling 2021).</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (h) <i>When calculating pen space allocation and penning livestock:</i></p> <p><i>h) where the total air export journey time scheduled is greater than 24 hours, the pen area per head must be increased by 10% (not cumulative with other requirements in Standards 6.2 to 6.10).</i></p>	<p>IATA LAR 8.2.2 <i>A 10% decrease in stocking density is recommended for trips in excess of 24 hours.</i></p> <p>OIE TAHC 7.4.3 <i>A 10% decrease in stocking density is recommended for trips in excess of 24 hours.</i></p>	<p>Std 6.1.14 (h) is closely aligned with IATA LAR and OIE TAHC requirements.</p> <p>The Land Transport Standards do not require extra space to be provided for livestock on long journeys.</p> <p>Pen area allocation is critical to both animal welfare and the economics of exporting livestock by air.</p> <p>Animals confined in an aircraft crate must be stocked densely enough to provide mutual support, as this reduces the risk of injury at take-off, during turbulence and at landing. There must also be enough space for animals to sit down and get up without risk of injury or crushing.</p> <p>The animal welfare justification for extra pen space for air transport journeys greater than 24 hours is presumably to facilitate animals sitting down and resting, but the benefits (if any) of 10% extra pen space have not been demonstrated.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.14 (i) <i>When calculating pen space allocation and penning livestock:</i></p> <p>i) <i>when livestock are loaded with mixed cargo in aircraft lower holds, the pen area must be increased by 10% (cumulative with other requirements in Standards 6.2 to 6.10).</i></p>	<p>IATA LAR and OIE TAHC do not require additional pen space when livestock are loaded in a lower cargo hold, whether as a mixed cargo or as a livestock only cargo.</p>	<p>There is much variation in aircraft ventilation systems (Marosszéky 2009). If an aircraft’s environment control system is deemed suitable for the carriage of livestock and is working properly, there should be more than enough air exchange to disperse the heat, moisture and noxious gas generated by stock in a lower hold (Hogan and Binns 2010). However, the position of air inlets and outlets and physical barriers may channel air down the sides of the hold and create ventilation dead space inside livestock crates within the hold. Cross ventilation through livestock crates is a critically important design feature (Hogan and Willis 2009).</p> <p>The risk of ventilation failure in a lower cargo hold is greater than on the main deck because of the confined space. The top of a cattle crate or double-deck sheep/goat crate is only a few centimetres below a lower cargo hold ceiling. This limits air flow over the crate.</p> <p>With a ‘mixed cargo’, where a lower cargo hold has livestock and other freight, there is less heat, moisture and noxious gas to disperse than if the hold was fully loaded with livestock. However, a solid barrier of other cargo may restrict air flow.</p> <p>Restricted air flow is the key risk factor for ventilation failure in a lower cargo hold. Reduced stocking density is of marginal benefit.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.15 <i>Pen space allocation and penning arrangements must conform to Standard 6.1.14 and the relevant species specifications in Standards 6.2 to 6.10 and with any relevant requirements, and applicable legislation. The exporter must comply with directions from an authorised officer in relation to pen space allocation to remove an animal or animals from a crate to ensure animal health and welfare and compliance with these standards.</i></p>	<p>IATA LAR 1.1 <i>These (Regulations) are not intended to be used for enforcement purposes but for guidance purposes only.</i></p> <p>IATA LAR and OIE TAHC do not have regulatory standing and are only enforceable if referenced in jurisdictional legislation.</p>	<p>ASEL has regulatory standing under the <i>Export Control Act 2020</i> and the <i>Export Control (Animals) Rules 2021</i>.</p> <p>ASEL sets minimum animal health and welfare standards across the livestock export supply chain, including pen space allocation by species. Compliance with ASEL is mandatory.</p> <p>An exporter must comply with all reasonable directions from an authorised officer regarding compliance with ASEL, not just in relation to pen space.</p> <p>Std 6.1.15 seems unnecessary.</p>


ASEL 3.2	International requirements	Evidence base, intent and interpretation								
<p>Std 6.1.16 <i>Livestock that are declared to be pregnant must not be tendered for transport to the airport unless accompanied by a veterinary certificate certifying that the animal is fit to travel and there is no evidence of imminent parturition at the time of loading for transport.</i></p> <p>Std 6.5.5 <i>Female cattle sourced for export as breeder animals must be no more than 190 days pregnant at the scheduled date of export, unless otherwise provided in a ‘last third of pregnancy management plan’ approved in writing by the department,</i></p> <p>Std 6.7.6 (c) <i>Female goats sourced for export as breeder animals must be no more than 100 days pregnant at the scheduled date of export, unless otherwise provided in a ‘last third of pregnancy management plan’ approved in writing by the department.</i></p> <p>Std 6.9.5 (c) <i>Female sheep sourced for export as breeder animals must be no more than 100 days pregnant at the scheduled date of export, unless otherwise provided in a ‘last third of pregnancy management plan’ approved in writing by the department.</i></p>	<p>IATA LAR 1.2.3 <i>The shipper is required to declare when animals are pregnant. The shipping of near-term pregnant animals should be avoided. Mammals should be shipped during the first two-thirds of pregnancy. During the last one-third of pregnancy, the chance of abortion or injury to the fetus increases.</i></p> <p>OIE TAHC 7.4.2 <i>Heavily pregnant animals should not be carried except under exceptional circumstances. Pregnant animals should not be accepted when the last service or exposure to a male prior to departure has exceeded the following time given here for guidance only.</i></p> <table border="1" data-bbox="878 826 1357 1075"> <thead> <tr> <th></th> <th>Maximum days since last service</th> </tr> </thead> <tbody> <tr> <td>Cows</td> <td>250</td> </tr> <tr> <td>Ewes</td> <td>115</td> </tr> <tr> <td>Nannies (goats)</td> <td>115</td> </tr> </tbody> </table> <p><i>Where service dates or date of last exposure to a male are not available, the animals should be examined by a veterinarian to ensure that pregnancy is not so far advanced that animals are likely to give birth during transport or suffer unnecessarily.</i></p> <p><i>Any animal showing udder engorgement and slackening of the pelvic ligament should be refused.</i></p>		Maximum days since last service	Cows	250	Ewes	115	Nannies (goats)	115	<p>The intent of the suite of ASEL standards regarding stage of gestation and the fitness of pregnant animals to travel is consistent with IATA LAR and OIE TAHC requirements – protecting the welfare of animals vulnerable in advanced pregnancy.</p> <p>The maximum stage of pregnancy allowed under ASEL without a ‘last third of pregnancy management plan’ is aligned with IATA LAR recommendations.</p> <p>The maximum stage of pregnancy allowed under ASEL without a ‘last third of pregnancy management plan’ is more conservative than in the OIE TAHC guidelines. However, there is provision in ASEL for Australian livestock to be exported by air during the last trimester of pregnancy, provided there is a management plan in place to protect animal welfare during the journey.</p> <p>The maximum stage of pregnancy allowed in ASEL 2.3 was 250 days for cattle and 115 days for sheep and goats, as in OIE TAHC, but was later amended to align with the IATA LAR’s ‘first two-thirds of pregnancy’ recommendation – 190 days for cattle and 110 days for sheep and goats.</p> <p>In mid to late pregnancy, estimates of gestation length based on manual palpation or ultrasound scanning have a significant plus/minus confidence interval (Blackwood 2020, Laven 2016).</p>
	Maximum days since last service									
Cows	250									
Ewes	115									
Nannies (goats)	115									

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.17 <i>Livestock must not be exported with young at foot, unless otherwise provided in a 'livestock with young at foot management plan' approved in writing by the department.</i></p>	<p>IATA LAR 1.2.2 <i>It is particularly difficult, and impossible in most cases of transport by air, to ensure that a very young mammal can receive appropriate protection, care and nourishment in transit. Shippers must therefore not tender for shipment:</i></p> <ul style="list-style-type: none"> <i>mammals with suckling young, unless a veterinary certificate states that both the mother and young are fit to travel.</i> <p>OIE TAHC does not have any specific requirements for livestock with young at foot.</p>	<p>Std 6.1.17 is consistent with IATA LAR requirements – protecting the welfare of animals vulnerable because of their very young age and immaturity.</p>
<p>Std 6.1.18 <i>Livestock must not be exported:</i></p> <p>a) <i>within 5 days of giving birth; or</i></p> <p>b) <i>more than 5 days but less than 15 days of giving birth, unless otherwise provided in a 'livestock that have recently given birth' management plan approved in writing by the department.</i></p>	<p>IATA LAR 1.2.3 <i>Only animals that appear to be in good health and condition and fit to travel to the final destination should be tendered for carriage by air. The shipper is required to declare when animals have given birth in the last 48 hours.</i></p> <p>OIE TAHC does not have any specific requirements for livestock that have recently given birth.</p>	<p>Std 6.1.18 is consistent with the intent in IATA LAR – protecting the welfare of animals vulnerable because they have recently given birth.</p> <p>Std 6.1.18 is more onerous than IATA LAR. However, this is not a practical constraint, as animals that have given birth in the last 15 days are not normally presented for export, and if an animal has given birth during the previous 6-15 days it may still be exported, with a management plan to protect its health and welfare.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.19 <i>Female livestock must not be treated with a prostaglandin drug:</i></p> <p>a) <i>within the 60 day period prior to export unless they have been pregnancy tested immediately before prostaglandin treatment and declared to be in the first trimester of pregnancy or not detectably pregnant; nor</i></p> <p>b) <i>within 14 days prior to export.</i></p>	<p>IATA LAR and OIE TAHC do not place any restrictions on the use of prostaglandins.</p>	<p>ASEL restrictions on prostaglandin treatment were introduced to manage welfare risks for feeder heifers exported by sea – as adequate care could not be guaranteed in a shipboard environment for cattle with metritis secondary to prostaglandin induced abortion.</p> <p>Std 6.1.19 has limited relevance for cattle exported by air. This is because:</p> <ul style="list-style-type: none"> • there are very few feeder heifers exported by air - none since 1 January 2016; • Std 6.5.4 provides separate assurance that feeder and slaughter cattle exported by air are not detectably pregnant; • prostaglandins are Schedule 4 drugs with use restricted to registered veterinarians - which provides an additional layer of professional oversight; and • with inspection for fitness to travel prior to departure, and a flight time of only a few hours, even if an animal was early pregnant and was injected with prostaglandin, metritis treatment would not be necessary during the journey. <p>There are no obvious welfare risks involved and no parallel requirement in IATA LAR or OIE TAHC.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.20 <i>Miniature breeds of livestock and other light weight breeds that do not meet minimum liveweight requirements, must not be sourced for export or exported unless otherwise provided in a 'miniature or light weight breed livestock management plan' approved in writing by the department.</i></p> <p>Note: The minimum liveweights specified in ASEL 3.2 for livestock exported by air are:</p> <ul style="list-style-type: none"> • cattle: 150 kg (Std 6.5.2a) • sheep: more than 20 kg (Std 6.9.2) • goats: more than 14 kg (Std 6.7.3) 	<p>IATA LAR and OIE TAHC do not specify minimum weights for livestock exported by air. Nor do they require a management plan for animals below a specified liveweight.</p>	<p>The Land Transport Standards do not specify a minimum weight for cattle, sheep or goats, or require a management plan for animals below a specified liveweight.</p> <p>Immature, light weight animals are more vulnerable and require greater care during transportation – hence the minimum weights in ASEL 3.2.</p> <p>Std 6.1.20 enables the export of miniature and light weight breeds that would otherwise be excluded from export as not meeting minimum weight requirements, despite being suitably mature and fit to export.</p>
<p>Std 6.1.23 <i>Prior to aircraft departure, the exporter must notify the airline and confirm they will notify the captain of the aircraft of the species, location, quantity, any special requirements and any aspect of preparation of the livestock for export that might affect their health or welfare, including ventilation requirements, during flight and any transit stops if relevant.</i></p>	<p>IATA LAR 7.3 and 10.6 <i>The Captain must be advised of the species, location and quantity of all live cargo on board the aircraft. The flight crew must be notified via a "Special Load Notification to Captain" (NOTOC) or similar form (in printed form or by electronic means) of any live animal load and of the required actions (hold temperature, light, ventilation, etc).</i></p> <p>OIE TAHC does not require a shipper to provide the airline or aircraft captain with livestock cargo details or special management requirements.</p>	<p>Std 6.1.23 is closely aligned with IATA LAR.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.24 <i>Unless the exporter has approval under Standard 6.1.25, on flights where livestock are accessible during the flight, a competent stock handler who is employed or contracted by the exporter must accompany consignments to oversee the welfare of the livestock during the flight. Compliance with this standard will be delayed until further notice by the department.</i></p> <p>Std 6.1.25 <i>An exporter may apply for an alternative arrangement to Standard 6.1.24 when providing a NOI under the Export Control Act 2020 and the Export Control (Animals) Rules 2021. The alternative arrangement may be approved where the Secretary, or delegate, is satisfied that the international transport arrangements for the livestock are adequate for their health and welfare.</i></p>	<p>IATA LAR 1.2.8 <i>The shipper or the carrier must provide a competent attendant/s when a shipment of animals is accompanied as required by the laws of the countries involved, or as required by the air carrier providing transportation.</i></p> <p>IATA LAR 1.2.9 <i>All personnel who accompany animals transported by air must, if requested, demonstrate competency in the care and handling of the species being transported. An individual deemed competent to accompany a shipment of animals should possess:</i></p> <ul style="list-style-type: none"> • <i>working knowledge of the IATA LAR, in particular the Container Requirements.</i> • <i>knowledge of the animal health and welfare regulations and document requirements applicable to the countries of origin, transit and destination.</i> • <i>knowledge of the handling and caring of animals during loading, flight, unloading, and during take-off and landing.</i> • <i>ability to recognize an animal which is ill or becomes unfit for air transport.</i> • <i>ability to recognize signs of stress and their causes and how to reduce these.</i> • <i>skill in the treatment of injuries, when and how to administer veterinary drugs (when and where permitted) and when and where to euthanize an animal, if necessary.</i> • <i>working knowledge of aircraft and airport operations and procedures.</i> 	<p>Std 6.1.24 is consistent with the intent in IATA LAR – ensuring there is a competent stock handler to oversee animal welfare during the flight.</p> <p>OIE TAHC does not require livestock transported by air to be accompanied by a stock attendant.</p> <p>A stock attendant accompanying livestock overseas is a significant commercial cost – especially for small consignments.</p> <p>ASEL does not specify competency standards or how a person nominated to accompany livestock exported by air can demonstrate competency.</p> <p>IATA has a Live Animals Regulations training course. It covers procedures for cargo handling agents, airline check-in staff and others processing live animal cargos on the ground, but not the skills required by a professional livestock attendant.</p> <p>IATA LAR does not require a certificate of competency for aircraft stock attendants.</p> <p>LiveCorp has contracted development of a training module for aircraft stock attendants. However, with implementation of Std 6.1.24 on hold, development of LiveCorp’s aircraft stock attendant training module is also on hold.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.26 <i>Livestock must be checked by a competent stock handler appointed by the exporter to ensure they remain healthy and fit to travel for all flights:</i></p> <ul style="list-style-type: none"> a) <i>at the last reasonable opportunity before departure of the aircraft; and</i> b) <i>if there is a competent stock handler travelling on the flight, and where feasible:</i> <ul style="list-style-type: none"> i) <i>within 60 minutes of commencement of the flight; and</i> ii) <i>at least every 3 hours during the flight; and</i> c) <i>at the first reasonable opportunity after landing, including during transit/transshipment stops; and</i> d) <i>at the last reasonable opportunity before departure during any transit/transshipment stops.</i> 	<p>IATA LAR 5.2 <i>Travelling has an unsettling effect on animals and they must be disturbed as little as possible. People must be stopped from disturbing animals by looking at them unnecessarily for the sake of curiosity. Visual examination to check welfare must be kept to a minimum. Domesticated animals prefer dim light as this calms and secures them.</i></p> <p>OIE TAHC does not specify when livestock should be checked during the flight.</p>  <p>Cattle in double-deck crates on a 747 freighter. Inspecting cattle from the narrow side walkway is severely restricted and handling cattle in the crates is impossible during the flight.</p>	<p>Std 6.1.26 (a) (c) and (d) are accepted industry best practice (Brightling 2021).</p> <p>Std 6.1.26 (b) is contrary to IATA recommendations and is not animal welfare best practice.</p> <p>Livestock in a lower cargo hold are not accessible and cannot be physically inspected during flight.</p> <p>Livestock on a freighter main deck can be inspected during flight, but this should be kept to a minimum for safety and animal welfare reasons:</p> <ul style="list-style-type: none"> • Entry to the main deck of a freighter during flight is a workplace health and safety risk if there is turbulence (no safety belt), loss of pressure (no oxygen, unless a portable oxygen bottle and mask are taken in), no buddy support and minimal lighting. • Access to livestock in a netted crate is severely restricted and it is not safe to open a crate or put your arm through. • During flight, stress on the livestock is least if they are left quietly alone with lights dimmed. <p>When there are livestock on board, it is critically important to monitor cargo hold temperatures. ASEL would be enhanced if temperature monitoring rather than physical inspection is required during flight. Temperature monitoring is also needed during transit stops.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.27 Any livestock for export identified prior, during, or immediately after transport by air as being distressed or injured must, where feasible:</p> <p>a) be given prompt treatment; and/or</p> <p>b) be euthanised without delay as necessary; and</p> <p>c) arrangements must be made to remove or separate sick or dead livestock from pens carrying multiple animals in transit. If animals need to be unloaded, arrangements must be made to ensure the health and welfare of the animals.</p>	<p>IATA LAR 10.7.1 When feasible:</p> <ul style="list-style-type: none"> • arrange for animals injured or having become apparently ill during carriage to receive veterinary treatment, and • arrangements must be made to remove or separate sick or dead animals from cages carrying multiple animals in transit. Such action must only be taken in consultation with the most expert advice available. <p>OIE TAHC does not specify what action, if any, is required if animals are distressed, sick or injured during air transport.</p>	<p>Std 6.1.27 (a) and (b) are consistent with community expectations and animal welfare legislation in all Australian states – that animals which are distressed, sick or injured are promptly and appropriately treated or promptly and humanely destroyed.</p> <p>Std 6.1.27 (c) mirrors the wording in IATA LAR 10.7.1, except ‘animals’ has been changed to ‘livestock’ and ‘cages’ has been changed to ‘pens’.</p> <p>The IATA LAR 10.7.1 recommendations are generic, across all species. While it may be possible to safely remove a small animal from an airline cage during transit, it is never possible to safely remove a sick or dead animal from an aircraft crate carrying multiple livestock during flight and it may not be practical or safe to do so during a transit stop.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.28 <i>Feed and water must be provided to livestock while in transit if climatic conditions, species, class of livestock or total air export journey time warrant.</i></p>	<p>IATA LAR 5.1.1</p> <ul style="list-style-type: none"> • Prior to dispatch <i>It is recommended that ruminants receive their normal ration. They must not be overfed since an abnormal increase could cause internal injury involving the gastric compartment, especially if there is a lot of movement during transportation.</i> • <i>Watering is very important and if this cannot be performed during flight, the animal must, at least, be watered before dispatch and upon arrival.</i> <p>OIE TAHC does not have any recommendations regarding provision of feed or water to livestock transported by air.</p>	<p>IATA LAR does not recognise the benefits of a feed and water curfew before livestock transportation – less risk of injury and cleaner animals (Pethick 2006).</p> <p>When livestock are transported by air, less soiling of the aircraft crates (and hence less risk of effluent spillage into the aircraft) and less ammonia production in the confines of the aircraft hold during flight are also significant benefits.</p> <p>IATA LAR feeding and watering recommendations for ruminants need to be updated.</p> <p>Std 6.1.9 requires compliance with water deprivation times in the Land Transport Standards. If the Land Transport Standards are met, the benefits of the additional requirements in Std 6.1.28 are not obvious.</p> <p>Std 6.1.28 is poorly crafted regulation, as the circumstances (climatic conditions, species, class of livestock and/or journey time) where feed and water must be provided in transit are not clearly specified.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.1.30 <i>The ventilation and temperature in the livestock hold must be adequate to maintain the health and welfare of the livestock at all times while livestock are in the aircraft.</i></p>	<p>IATA LAR 5.1.9 Environmental outlines the risks from extremes of temperature, high humidity, wind chill and exposure to radiant heat. It is mostly descriptive, but there are firm recommendations regarding transit stops.</p> <p><i>During prolonged transit stops, when the ramp temperature exceeds approximately 20°C the aircraft compartment doors must be opened. In extreme temperatures, ground equipment must be used to control the condition of the air within the compartments. The different climatic factors prevailing during a journey must always be considered when arranging the routing and carriage of live animals.</i></p> <p>OIE TAHC 7.4.4 <i>Animals are affected by extremes of temperature. This is especially true of high temperature when compounded with high humidity. Temperature and humidity should therefore be taken into consideration when planning the shipment.</i></p> <p><i>Times of arrival, departure and stopovers should be planned so that the aircraft lands during the coolest hours. At outside temperatures of below 25°C at the landing point, the aircraft doors should be opened to ensure adequate ventilation.</i></p> <p><i>When outside temperatures at any landing point exceed 25°C, prior arrangements should be made to have an adequate air-conditioning unit available when the plane lands.</i></p>	<p>Ensuring adequate dispersion of the heat, moisture and noxious gases generated by the animals on board during the flight, and especially during transit stops, is critically important. This requires an environment control system (ECS) on the aircraft that is suitable for the livestock cargo and operates correctly throughout, livestock crates designed to allow air to flow freely through the crate without ventilation dead space, and cargo positioning on the aircraft such that air flow through and over livestock crates is not obstructed (Brightling 2021, Le 2012, Marosszéky 2009; SAE Aerospace 2015).</p> <p>Std 6.1.30 is well intended, but is poorly crafted regulation, as it does not specify what ventilation and temperature is ‘adequate’ to maintain the health and welfare of livestock on the aircraft, or what an exporter must do to mitigate risks.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.5.1 <i>Cattle must have been weaned at least 14 days prior to sourcing for export, unless the exporter has approval under Standard 6.1.17 to export livestock with young at foot.</i></p> <p>Std 6.7.1 <i>Goats must have been weaned at least 14 days prior to sourcing for export, unless the exporter has approval under Standard 6.1.17 to export livestock with young at foot.</i></p> <p>Std 6.9.1 <i>Sheep must have been weaned at least 14 days prior to sourcing for export, unless the exporter has approval under Standard 6.1.17 to export livestock with young at foot.</i></p>	<p>IATA LAR 1.2.2 <i>Shippers must not tender for shipment:</i></p> <ul style="list-style-type: none"> <i>Newly weaned animals, unless arrangements have been made to feed them at appropriate intervals and there is access in flight when necessary for this and the environment is conducive to maintaining temperatures for these young animals.</i> <p>OIE TAHC does not have any weaning requirements for livestock transported by air.</p>	<p>This suite of ASEL standards is consistent with the intent of IATA LAR 1.2.2 – protecting the welfare of animals vulnerable because of immaturity and recent weaning.</p> <p>The Land Transport Standards include extra requirements to protect the welfare of bobby calves less than 30 days of age, but do not have any specific requirements for cattle weaned after 30 days of age, nor for recently weaned sheep or goats of any age.</p> <p>Stds 6.5.1, 6.7.1 and 6.9.1 do not constrain the industry, as animals weaned less than 14 days are not normally presented for export, and Std 6.1.17 allows the export of unweaned animals, subject to a management plan approved by the Department.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.5.2 (a) <i>Cattle sourced for export must have an individual liveweight of between 150 kg and 650 kg (inclusive). Animals outside these weights must not be sourced for export or exported, unless:</i></p> <p>a) <i>for cattle less than 150 kg, the exporter has approval under Standard 6.1.20 to export miniature or light weight breed livestock.</i></p>	<p>IATA LAR and OIE TAHC do not specify a minimum weight for cattle transported by air or require a management plan for cattle below a specified threshold.</p> <p>The stocking density calculation table and graphs in IATA LAR 8.2.2 use reference weights of 50-90 kg for calves and 300-700 kg for cattle.</p> <p>The stocking density table in OIE TAHC 7.4.3 has the same liveweight reference ranges as IATA LAR.</p>	<p>IATA LAR and OIE TAHC allow air freight of calves as light as 50 kg, without any additional management requirements.</p> <p>There is merit in restricting the export of very young, light weight cattle that are more vulnerable to the stresses of handling, transport and time off feed and water.</p> <p>The Land Transport Standards define a bobby calf as a calf not accompanied by its mother, less than 30 days old and less than 80 kg liveweight. Land transport of bobby calves is allowed in Australia but is subject several additional requirements to mitigate welfare risks. These include keeping the journey as short as possible.</p> <p>ASEL allows cattle under 150 kg liveweight to be exported if they are a miniature or light weight breed. However, this does not apply to young animals of standard cattle breeds that weigh less than 150 kg because of age and immaturity.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.5.2 (b) <i>Cattle sourced for export must have an individual liveweight of between 150 kg and 650 kg (inclusive). Animals outside these weights must not be sourced for export or exported, unless:</i></p> <p><i>b) for cattle more than 650 kg, otherwise provided in a heavy cattle management plan approved in writing by the department.</i></p>	<p>IATA LAR and OIE TAHC do not specify maximum weights for cattle transported by air or require a management plan for cattle above a specified threshold.</p> <p>The stocking density calculation table and graphs in IATA LAR 8.2.2 use reference weights of 300-700 kg for cattle, with extrapolation to higher weights.</p> <p>The stocking density table in OIE TAHC 7.4.3 has the same liveweight reference ranges as IATA LAR.</p>	<p>There are good reasons to require a ‘heavy cattle management plan’ for cattle 650 kg plus exported by sea – they are more liable to injury from slipping over on a wet deck, more prone to lameness from standing on a hard deck for many days, may be difficult to move up and down the ship’s ramps and are at greater risk of heat stress during the voyage.</p> <p>These risks do not apply to cattle exported by air – where crates have soft, absorbent bedding, there are no ramps for the cattle to go up or down, and there is a much shorter travel time.</p> <p>There is no known history of welfare problems with heavy cattle exported from Australia by air. Rather, there is a history of very good welfare outcomes for heavy cattle exported by air. However, with very heavy cattle a strengthened crate may be required.</p> <p>The requirement for a ‘heavy cattle management plan’ seems to have been derived from the requirements for export by sea, but it does not address a significant animal welfare risk for cattle exported by air.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.5.3 <i>Cattle must not be sourced for export or exported unless they have been assessed by a competent stock handler against the non-dairy breed cattle body condition scoring Table 29 or dairy breed cattle body condition scoring in Figure 5 and have a body condition score of:</i></p> <p>a) <i>for non-dairy breed cattle, 2 or more but less than 5 (on a scale of 0 to 5); and</i></p> <p>b) <i>for dairy breed cattle, 3.5 or more but less than 5.5 (on a scale of 1 to 8).</i></p> <p>Std 6.5.3 is supported by a table and two figures that provide details about assessing cattle body condition score.</p> <ul style="list-style-type: none"> • Table 29 Non-dairy breed cattle body condition score • Figure 4 Visual aid for assisting with body condition scoring of non-dairy breed cattle • Figure 5 Dairy breed cattle body condition score (diagram shows 3 to 6 on scale of 1 to 8). 	<p>IATA LAR and OIE TAHC do not specify minimum or maximum body condition scores for cattle transported by air.</p>	<p>Std 6.5.3 is similar to Std 1.4.4 for cattle exported by sea, but with a minor change, allowing non-dairy breeds in condition score 4.5 to be exported by air. There are sound reasons to restrict sea shipment of cattle in very light condition (less competitive at the feed trough) and in very fat condition (greater risk of heat stress). These are not practical welfare concerns for cattle exported by air.</p> <p>Most of the Australian cattle exported by air are dairy heifers. Body condition scoring has limited application for dairy heifers, as condition scoring principally measures subcutaneous fat and relatively little subcutaneous fat is laid down during a heifer’s active growth phase.</p> <p>Limiting the export of dairy cattle to animals with a condition score of 3.5 to 5 (on a scale of 1 to 8), is quite restrictive.</p> <p>The Land Transport Standards do not specify minimum or maximum body condition scores for cattle transported domestically in Australia.</p> <p>The welfare risks (if any) of exporting cattle by air in very light or very fat condition are mitigated by the commercial imperative to deliver quality animals.</p> <p>There is no known history of welfare concerns with very light or fat cattle exported from Australia by air.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.5.6 <i>Unless otherwise provided in a long-horned livestock management plan approved in writing by the department, cattle with horns must only be sourced for export or exported if the:</i></p> <p>a) <i>solid the non-vascular tip has been removed to a diameter of 3 cm (or less if the horn vasculature does not allow) and horns have a blunt horn end; and</i></p> <p>b) <i>horns are no longer than 12 cm in length at the time of export.</i></p>	<p>IATA LAR and OIE TAHC do not have any specifications for horns on cattle transported by air.</p>	<p>Horned cattle are a welfare risk to other cattle in the consignment and a safety risk for animal handlers (Strappini et al. 2009, Wythes et al. 1985).</p> <p>The Land Transport Standards include a horn tipping requirement for bulls, but do not specify a maximum horn length and do not have a horn standard for other classes of cattle. LTS GB 4.16 states... <i>Horned bulls should have the non-vascular horn tip removed to a diameter of three cms.</i></p> <p>The basis for classifying cattle with horns longer than 12 cm as ‘long-horned’ animals is unclear.</p> <p>Std 6.5.6 has minimal impact on the industry, as there are very few horned cattle exported by air.</p>
<p>Std 6.5.8 <i>When calculating pen space allocation, the pen area per head must be increased by 10% for cattle with horns.</i></p>	<p>IATA LAR does not require any additional pen space or have any other specific requirements for horned cattle.</p> <p>OIE TAHC does not require any additional pen space for horned cattle but does require them to be penned separately from cattle without horns.</p> <p>OIE TAHC 7.4.1 2(c) <i>Cattle with and without horns should be separated from each other.</i></p>	<p>The Land Transport Standards do not require extra pen space for horned cattle transported domestically.</p> <p>The OIE TAHC requirement for cattle with and without horns to be penned separately is covered by ASEL Std 6.1.14 (f), which requires animals to be penned with others of the same species and class.</p> <p>Whether or not it is beneficial to give 10% more pen space to horned cattle exported by air is unclear. However, Std 6.5.6 has minimal impact on the industry, as there are very few horned cattle exported by air.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.7.2 <i>Goats must not be sourced for export unless they have become conditioned to being handled and to eating and drinking from troughs for a minimum of 21 days.</i></p>	<p>IATA LAR and OIE TAHC do not have any handling, eating, drinking or other domestication requirements for goats transported by air.</p>	<p>Std 6.7.2 is based on historical poor animal welfare outcomes for rangeland goats exported by sea and a higher mortality rate during land transport and in abattoir lairages in Australia. Limited domestication of rangeland goats trapped or mustered in the pastoral zone is a key risk factor (Miller et al 2016, More and Brightling 2003, Williams 2009).</p> <p>Animal welfare risks extend beyond arrival at the destination airport. Std 6.7.2 is a prudent requirement to manage the welfare risks for rangeland goats in preparation for export, during the flight and after arrival overseas.</p>
<p>Std 6.7.3 <i>Goats must not be sourced for export or exported unless they have a liveweight of more than 14kg. Goats less than this weight must not be sourced for export or exported, unless the exporter has approval under Standard 6.1.20 to export miniature or light weight breed livestock.</i></p>	<p>IATA LAR and OIE TAHC do not specify a minimum weight for goats transported by air or require a management plan for goats below a specified threshold.</p>	<p>There is merit in requiring additional risk mitigation procedures and/or restricting the export of young, light weight goats, as they are more vulnerable to the stresses of handling, transport and time off feed and water - especially so for rangeland goats.</p> <p><i>The Review of the Australian Standards for the Export of Livestock: Air transport</i> (Department of Agriculture 2019) reported consensus that welfare risks are greater for light weight goats. There are divergent views on an appropriate minimum weight to embed in the ASEL standards.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.7.4 <i>Goats must not be sourced for export or exported unless they have been assessed by a competent stock handler against the goat body condition scoring in Table 33 and have a body condition score of 2 or more but less than 4 (on a scale of 1 to 5).</i></p> <p>Std 6.7.4 is supported by a table and figure that provide more details about assessing body condition score in goats.</p> <ul style="list-style-type: none"> • Table 33 Goat body condition score • Figure 6 Visual aid for assisting with body condition scoring of goats. 	<p>IATA LAR and OIE TAHC do not specify a minimum or maximum body condition score for goats transported by air.</p>	<p>Std 6.7.4 is similar to Std 1.6.5 for goats exported by sea, but is more restrictive, as goats in condition score 4 may be exported by sea (on voyages of up to 10 days) but may not be exported by air.</p> <p>There is merit in restricting the export of very lean goats that have few energy reserves for the stresses of handling, transport, time off feed and inappetence (Gaden et al. 2005). This is mainly a risk for rangeland slaughter goats. With breeder goats the commercial imperative to deliver animals fit for purpose mitigates the risk of exporting emaciated animals.</p> <p>There are no obvious reasons to restrict the export of goats in condition score 4 or more.</p> <p>Body condition scoring is less suitable for dairy goats, as dairy breed goats tend to store intra-abdominal fat rather than subcutaneous fat on their backs. Body condition scoring is also of limited value for goat kids, as relatively little subcutaneous fat is laid down during a kid’s active growth phase.</p> <p>If strictly enforced, limiting the export of goats by air to animals with a condition score of 2 to 3.5 (on a scale of 1 to 5), would be very restrictive.</p> <p>The Land Transport Standards do not specify minimum or maximum body condition scores for goats transported domestically in Australia.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.7.7 <i>Goats with horns must only be sourced for export or exported if:</i></p> <ul style="list-style-type: none"> a) <i>the horns would not cause damage to the head or eyes of the animal or other animals; and</i> b) <i>the horns would not endanger other animals during transport; and</i> c) <i>the horns would not restrict access to feed or water during transport; and</i> d) <i>unless otherwise provided in a long-horned livestock management plan approved in writing by the department, the horns:</i> <ul style="list-style-type: none"> i) <i>are no longer than 22cm with tips that are no more than 20cm apart; or</i> ii) <i>have tips that are further than 20cm apart, but the horns are no longer than 15cm and are blunt.</i> 	<p>IATA LAR and OIE TAHC do not have any restrictions on horned goats or require a long-horned livestock management plan for goats transported by air.</p>	<p>Horned goats are a potential welfare risk to other goats in the consignment. However, there are very few injuries to the head or eyes of other animals in a mob of horned goats, due to behavioural self-protection.</p> <p>It is not clear how an exporter consigning horned goats for export by air could demonstrate compliance with Stds 6.7.7 a and b.</p> <p>The scientific basis for the horn length and spread specified in Std 6.7.7 (d) is unclear.</p> <p>The <i>Review of the Australian Standards for the Export of Livestock: Air Transport</i> (Department of Agriculture 2019) noted concerns by exporters and vets about the practical difficulties of measuring horn lengths against a specific standard.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.7.9 (a) <i>When calculating pen space allocation, the pen area per head must be increased by 10%:</i></p> <p>a) <i>for goats with more than 25 mm of hair (not cumulative with (b));</i></p>	<p>IATA LAR does not recommend additional pen space for goats with more than 25 mm of hair.</p> <p>OIE TAHC 7.4.3. 1 (e) recommends additional pen space for sheep in wool, but does not specify a wool length or the extra pen area per head that should be allocated. There is not a parallel recommendation for goats in long hair.</p>	<p>For most consignments, 10% extra pen space causes a significant increase in per head costs.</p> <p>The Land Transport Standards do not require additional pen space to be allocated to goats with more than 25 mm of hair.</p> <p>Based on experience with sheep in long wool, there is an argument that goats with long hair have a larger pen area footprint than goats with short hair. This is presumably the basis for Std 6.7.9 (a).</p> <p>There is another intuitive argument that goats with long hair are less able to dissipate body heat by evaporative cooling from their skin, and that reducing stocking density is beneficial as it reduces the body heat that needs to be removed from the aircraft crate. However, with an environment control system in the aircraft capable of dissipating much more body heat than is generated by the livestock on board, the welfare benefits of requiring additional pen space simply to facilitate heat loss, are not obvious.</p> <p>It is not clear whether 10% extra pen space for goats with more than 25 mm of hair is either necessary or sufficient allowance for their larger pen footprint.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.7.9 (b) <i>When calculating pen space allocation, the pen area per head must be increased by 10%:</i></p> <p><i>b) for goats with horns in excess of Standard 6.7.7 (d) (not cumulative with a). These goats are to be penned separately.</i></p>	<p>IATA LAR and OIE TAHC do not recommend additional pen space for horned goats.</p>	<p>For most consignments, 10% extra pen space causes a significant increase in per head costs.</p> <p>The Land Transport Standards do not require additional pen space for horned goats.</p> <p>Allocating extra pen space to horned goats is presumably based on the assumption that a goat with long horns occupies more pen space than a goat of the same breed and weight but without long horns.</p> <p>Horn size and shape are likely to affect a goat’s pen area footprint.</p> <p>It is not clear whether 10% extra pen space for goats with horns in excess of Std 6.7.7 (d) is either necessary or sufficient.</p>
<p>Std 6.9.2 <i>Sheep must not be sourced for export or exported unless they have a liveweight of more than 20 kg. Sheep less than this weight must not be sourced for export or exported, unless the exporter has approval under Standard 6.1.20 to export miniature or light weight breed livestock.</i></p>	<p>IATA LAR and OIE TAHC do not specify a minimum weight for sheep transported by air or require a management plan for sheep below a specified threshold.</p> <p>The stocking density calculation table and graph in IATA LAR 8.2.2 use 25 kg as the lowest liveweight reference point for sheep.</p> <p>OIE TAHC 7.4.3 uses the same liveweight reference range for sheep as IATA LAR.</p>	<p>There is merit in requiring additional risk mitigation procedures and/or restricting the export of young, light weight lambs, as they are more vulnerable to the stresses of handling, transport and time off feed and water.</p> <p><i>The Review of the Australian Standards for the Export of Livestock: Air transport</i> (Department of Agriculture 2019) reported consensus that welfare risks are greater for light weight sheep, but divergent views on an appropriate minimum weight to embed in the ASEL standards.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.9.3 <i>Sheep must not be sourced for export or exported unless they have been assessed by a competent stock handler against the sheep body condition scoring in Table 35 and have a body condition score of 2 or more but less than 4 (on a scale of 1 to 5).</i></p> <p>Table 35 provides a description and line drawing for each body condition score 1-5 in sheep.</p>	<p>IATA LAR and OIE TAHC do not specify a minimum or maximum body condition score for sheep transported by air.</p>	<p>Std 6.9.3 is similar to Std 1.7.4 for sheep exported by sea, but is more restrictive, as sheep in condition score 4 may be exported by sea but not by air.</p> <p>There is merit in restricting the export of very lean sheep that have few energy reserves for the stresses of handling, transport and time off feed and water. This is a potential welfare issue for slaughter sheep exported by air. However, with breeder sheep the commercial imperative to deliver animals fit for purpose mitigates the welfare risk of exporting emaciated animals.</p> <p>Sheep with condition score greater than 4 have a higher risk of death from ‘failure to eat’ syndrome when exported by sea (Norris and Norman 2003). They are also more susceptible to heat stress. However, these are not issues of concern for sheep exported by air. There are no obvious welfare reasons to restrict the export by air of sheep in condition score 4 or more.</p> <p>Limiting the export by air of sheep with a body condition score 2 to 3.5 (on a scale of 1 to 5) is very restrictive.</p> <p>The Land Transport Standards do not specify minimum or maximum body condition scores for sheep transported domestically in Australia.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.9.6 <i>Sheep with horns must only be sourced for export or exported if the horns:</i></p> <ul style="list-style-type: none"> a) <i>would not cause damage to the head or eyes of the animal or other animals; and</i> b) <i>would not endanger other animals during transport; and</i> c) <i>would not restrict access to feed or water during transport; and</i> d) <i>are no longer than 1 full curl, unless otherwise provided in a long-horned livestock management plan approved in writing by the department.</i> 	<p>IATA LAR and OIE TAHC do not have any restrictions on horned sheep or require a long-horned livestock management plan for sheep transported by air.</p>	<p>There are very few injuries to the head or eyes of other animals in a mob of horned sheep, due to behavioural self-protection.</p> <p>A small-scale trial involving video surveillance of pens with polled, horned and mixed polled plus horned Merino sheep exported by sea found no negative health or behavioural differences between the groups (Stockman and Barnes 2008).</p> <p>It is not clear how an exporter consigning horned sheep for export by air could demonstrate compliance with Stds 6.9.6 a and b.</p> <p>Std 6.9.6 d is similar to Std 1.7.7 for sheep exported by sea. The requirement that sheep have horns no more than one full curl reduces the risk of sheep getting their horns entangled in railing and/or not being able to access feed and water troughs at sea. This is not an issue for sheep exported by air.</p>

ASEL 3.2	International requirements	Evidence base, intent and interpretation
<p>Std 6.9.8 <i>When calculating pen space allocation, the pen area per head must be increased by 10%:</i></p> <p>a) <i>for sheep with horns (not cumulative with b)); and</i></p> <p>b) <i>for sheep with more than 25 mm of wool or hair (not cumulative with a)).</i></p>	<p>IATA LAR does not recommend additional pen space for sheep with horns or sheep in wool.</p> <p>OIE TAHC does not require additional pen space for horned sheep.</p> <p>OIE TAHC 7.4.3. 1 (e) recommends additional pen space for sheep in wool, but does not specify a wool length or the extra pen area per head that should be allocated.</p>	<p>The Land Transport Standards recommend increasing floor area for sheep in more than half wool and for horned sheep, but do not suggest how much extra pen area should be allocated.</p> <p>LTS GB 11.9 <i>The above stocking densities represent the minimum area that should be allowed for a group of sheep or lambs that have an average live weight as specified and in half wool. As wool length increases, the floor area allowed for each animal should increase, or decrease for newly shorn sheep. An increased area per animal should also be allowed where sheep are horned.</i></p> <p>Std 6.9.8 (b) recognises that sheep in wool occupy more pen space than recently shorn sheep and is consistent with the intent of OIE TAHC and the Land Transport Standards. However, Std 6.9.8 (b) is more conservative than the Land Transport Standards, as a 25 mm fleece is invariably less than half wool.</p>

Table 7 - Comparison of LIVEXCollect and international requirements for livestock exported by air

LIVEXCollect	International requirements	Evidence base, intent and interpretation
<p>Consignment set up: The LIVEXCollect End-of-Journey report for livestock exports by air requires a minimum and maximum wet bulb temperature (WBT) recorded where livestock crates are held prior to aircraft loading.</p> <p>Drop-down boxes state that wet bulb temperatures should be collected at the coolest and hottest times of the pre-flight period, and that temperature must be taken from one representative area near the animal crates and at animal height.</p>	<p>IATA LAR Appendix C has a table with examples of acceptable ambient dry bulb temperature ranges for live animals, but they do not align with Australian experience.</p> <p>IATA LAR does not refer to wet bulb temperatures.</p> <p>OIE TAHC 7.4.4 (2) states that animals are affected by extremes of temperature and that temperature and humidity should be taken into account when planning a shipment, but there are no recommendations for maximum or minimum wet or dry bulb temperatures.</p>	<p>Industry best practice is for aircraft crates loaded with livestock to be kept in a low activity area, in shade and out of any rain until loaded onto the aircraft (Brightling 2021).</p> <p>Aircraft crates loaded with livestock are generally parked 'airside' - in an area with access restricted to ASIC holders or persons accompanied by someone with an ASIC pass.</p> <p>Loading livestock into crates at the airport is a critical phase of the live export process. Safely transferring livestock from truck to crate, ensuring animal comfort and appropriate stocking density, minimizing handling stress and preventing injuries and escapes should be the exporter's focus of attention. Multiple trips airside to record WBT is an unnecessary diversion.</p> <p>There is no reason to believe that WBT is a significant welfare concern for livestock in crates prior to loading on the aircraft.</p> <p>If required, historical temperature and humidity data at Australian airports is available from the Bureau of Meteorology.</p>

LIVEXCollect	International requirements	Evidence base, intent and interpretation
<p>Health report: The LIVEXCollect End-of-Journey report for livestock exported by air requires details of health conditions encountered, including animal identification, species and class, location on the aircraft, crate type and tier.</p> <p>Other health data required include:</p> <ul style="list-style-type: none"> • A diagnosis or presumptive diagnosis, by body system. • A diagnosis or presumptive diagnosis by clinical signs or syndrome. • Medications and treatments administered. • Other actions taken. <p>Drop down boxes offer a wide range of possible diagnoses for both body system and clinical signs and syndromes.</p>	<p>IATA LAR and OIE TAHC do not require investigation or reporting of health conditions encountered when livestock are transported by air.</p>	<p>The health report sheet in the LIVEXCollect End-of-Journey report for livestock exported by air appears to have been largely cut-and-pasted from the LIVEXCollect End-of-Voyage report for livestock exported by sea.</p> <p>Livestock exported by air are inspected for fitness to export shortly before loading, and most are delivered overseas within 24 hours of leaving Australia. Apart from a very rare critical incident associated with ventilation failure (none since 2015) and occasional injuries, there are almost no health issues encountered during livestock transportation by air.</p> <p>Nearly all of the diagnoses in the drop-down boxes are not relevant for livestock exported by air. A few examples include abnormal ovaries or testes, shy feeder, anorexia, poor body condition, pizzle rot, urinary tract obstruction, unhealed dehorning or tipping wounds, ear infection, pinkeye, blindness in both eyes, ringworm, dermatophilosis, buffalo fly lesions, papillomatosis – and more.</p> <p>There is no reasonable prospect of the diagnostic data in the Health report ever being interpreted in a meaningful way.</p>

LIVEXCollect	International requirements	Evidence base, intent and interpretation
<p>Birth and abortion: The LIVEXCollect End-of-Journey report for livestock exported by air requires details of any births and abortions.</p> <p>The information required includes:</p> <ul style="list-style-type: none"> • Animal identification, species and class of the dam. • When the birth or abortion occurred. • Where the dam was located on the aircraft. • For births – the outcome for the young. • For abortions – the estimated age of the foetus. • Medications / treatments given and other actions taken. 	<p>IATA LAR and OIE TAHC do not require birth or abortion reporting.</p>	<p>The births and abortions sheet in the LIVEXCollect End-of-Journey report for livestock exported by air appears to have been largely cut-and-pasted from the LIVEXCollect End-of-Voyage report for livestock exported by sea.</p> <p>There is no reason to believe that births or abortions have ever been an issue for Australian livestock exported by air.</p> <p>Numerical reporting of births and abortions (or lack thereof), by species, is useful for industry transparency reasons. This information is required in the End-of-Journey report Summary page.</p> <p>There is no reasonable prospect of the other data required on the Birth and abortion sheet for livestock exported by air ever being interpreted in a meaningful way – mainly because of a very small (if any) data set.</p>

LIVEXCollect	International requirements	Evidence base, intent and interpretation
<p>Mortality records: The LIVEXCollect End-of-Journey report for livestock exported by air requires mortality details including animal identification, species and class, location on the aircraft, crate type and tier.</p> <p>Cause of death data is also required, including:</p> <ul style="list-style-type: none"> • Was a post-mortem conducted? If No, why was a post-mortem not conducted? • A diagnosis or presumptive diagnosis, by body system. • A diagnosis or presumptive diagnosis, by clinical signs or syndrome. <p>Drop-down boxes offer a wide range of possible diagnoses, for both body system and clinical signs and syndromes.</p>	<p>IATA LAR and OIE TAHC do not require mortality investigations or reporting.</p>	<p>The mortality records page in the LIVEXCollect End-of-Journey report for livestock exported by air appears to have been largely cut-and-pasted from the LIVEXCollect End-of-Voyage report for livestock exported by sea.</p> <p>Some basic mortality reporting is important for welfare monitoring and transparency reasons – the number of deaths, species and class of livestock, crate type and location in the aircraft. However, there is no reasonable prospect of the diagnostic data ever being interpreted in a meaningful way. Problems with the diagnostic data include:</p> <ul style="list-style-type: none"> • A small data set – of the 39,880 cattle, sheep and goats exported in 2021, there were only three mortalities (one sheep and two goats). • It is rarely possible to do a credible post-mortem examination. It is not appropriate to do a field post-mortem on the tarmac or in the customs yard of an overseas airport, a veterinary pathologist is rarely on hand, and laboratory diagnostic support may not be readily available. • Most of the diagnoses in the drop-down boxes are not causes of death and are not relevant for livestock exported by air.

4.5. Stocking density – cattle

4.5.1. ASEL

Table 30 in ASEL 3.2 specifies the minimum aircraft crate pen area per head for cattle, by liveweight, with 10 kg increments for cattle in the weight range 150-650 kg. Cattle weighing less than 150 kg may only be exported with an approved *Miniature or light weight breed livestock management plan (ASEL Std 6.5.2 a)*, and cattle weighing more than 650 kg may only be exported with an approved *Heavy cattle management plan (ASEL Std 6.5.2 b)*. Management plans for cattle with a liveweight outside the range 150-650 kg presumably include a minimum pen area per head agreed between the exporter and Department.

4.5.2. International requirements

IATA 8.2.2 has a Calculation Table which provides stocking density guidelines, rather than a minimum aircraft pen area per head. The table has four liveweight reference points for cattle – 300, 500, 600 and 700 kg. There are also two liveweight reference points for calves – 50 and 90 kg.

Figure 8.2.2.A is a graph which allows interpolation between the cattle weights listed in the table. A footnote to Figure 8.2.2.A states that for animals exceeding the weights indicated, it is possible to approximate stocking density by extrapolation from the graph. **Figure 8.2.2.B** is a similar graph for calves, allowing a recommended pen area to be calculated by interpolation between the two calf reference weights in the Calculation Table.

OIE TAHC 7.4.3 has a recommended stocking density table for cattle, with the same reference weights and animal space requirements as IATA LAR.

4.5.3. Alignment of stocking density requirements

Table 8 compares the aircraft crate pen area required for cattle in ASEL 3.2 with that previously required in ASEL 2.3 and with the stocking density guideline for cattle of similar liveweight in IATA LAR.

Table 8 - Aircraft crate pen area for cattle (m²/head)

Liveweight	ASEL 2.3 Minimum area required	ASEL 3.2 Minimum area required	IATA stocking density guideline
200 kg	0.64	0.64	Not specified
300 kg	0.84	0.84	0.84
400 kg	1.06	1.06	1.06 *
500 kg	1.27	1.27	1.27
550 kg	1.38	1.38	1.38 *
600 kg	1.48	1.48	1.45
650 kg	1.59	1.59	1.57 *
700 kg	1.70	Not specified	1.63
800 kg	1.90	Not specified	Not specified
900 kg	2.12	Not specified	Not specified
1,000 kg	2.33	Not specified	Not specified

* Estimate by interpolation of space/weight graph (IATA Figure 8.2.2A)

For cattle with a liveweight in the range 300-550 kg, the minimum pen area required in ASEL is the same as that in IATA LAR.

ASEL requires slightly more pen space for cattle weighing over 550 kg than is required in IATA LAR and OIE TAHC. However the difference between ASEL and the IATA LAR pen area requirements for cattle weighing over 550 kg is marginal at best.

In ASEL 2.3 (Department of Agriculture, 2019), the table listing the minimum aircraft pen area per head for cattle went up to a liveweight of 1,000 kg. The upper liveweight in the table was reduced to 650 kg in ASEL 3.0, with a new requirement that cattle weighing more than 650 kg must have a 'heavy cattle management plan' approved by the Department. This change was likely made to align the ASEL Standards for sea and air transport – even though the welfare risks for heavy cattle exported by sea (slipping over on wet decks, lameness from standing on hard decks for many days, difficulty going up and down ramps and susceptibility to heat stress) do not apply to air freight.

When ASEL is next revised, there would be merit in extending the minimum aircraft pen area table for cattle to include weights up to 1,000 kg, as previously listed in ASEL 2.3. This would provide exporters of heavy cattle with greater certainty of stocking density requirements.

The minimum pen area table in ASEL is much more practical than the Calculation table and graphs in IATA LAR, as the table in ASEL clearly specifies the minimum pen area required, in 10 kg liveweight increments, without any need to interpolate from a graph. IATA LAR would be enhanced if the Calculation Table and graph for cattle is replaced with a minimum pen area table similar to that in ASEL 2.3.

4.6. Stocking density – sheep

4.6.1. ASEL

Table 36 in ASEL 3.2 specifies the minimum aircraft crate pen area for sheep, by liveweight, with 1 kg increments for sheep in the weight range 20-70 kg., then 5 kg increments from 70-100 kg.

Sheep weighing 20 kg or less may only be exported with an approved *Miniature or light weight breed livestock management plan (ASEL Std 6.9.2)*. A management plan for sheep weighing 20 kg or less presumably includes a minimum pen area per head agreed between the exporter and Department.

4.6.2. International requirements

IATA 8.2.2 has a Calculation Table which provides stocking density guidelines, rather than a minimum aircraft pen area per head. The table has two liveweight reference points for sheep – 25 and 70 kg. A graph (**Figure 8.2.2.B**) allows interpolation between the reference weights in the table. However, the small scale and limited detail in Figure 8.2.2.B precludes meaningful extrapolation of pen area requirements for sheep with weights outside the range 20-70 kg.

OIE TAHC 7.4.3 has a recommended stocking density table for sheep, with the same reference weights and animal space requirements as IATA LAR.

4.6.3. Alignment of stocking density requirements

Table 9 compares the minimum pen area required for sheep in ASEL with the stocking density guideline for sheep in IATA LAR.

Table 9 - Aircraft crate pen area for sheep (m²/head)

Liveweight	ASEL 3.2 Minimum area required	IATA stocking density guideline
20 kg	0.150	0.170
30 kg	0.190	0.184 *
40 kg	0.230	0.236 *
50 kg	0.270	0.290 *
60 kg	0.315	0.315 *
70 kg	0.360	0.360
80 kg	0.405	Not specified
90 kg	0.450	Not specified
100 kg	0.495	Not specified

* Estimate by interpolation of IATA Figure 8.2.2.B

The minimum pen area required in ASEL and the stocking density guidelines in IATA LAR are the same for sheep with a liveweight in the range 60-70 kg. ASEL requires slightly more pen space for sheep weighing 30 kg, but significantly less for lighter sheep, and for sheep in the 40-50 kg weight range.

The pen area requirements in ASEL and IATA LAR are substantially different for sheep weighing less than 60 kg, with significant animal welfare and economic consequences. Hard evidence is needed to justify changing the existing ASEL minimum pen area requirements and/or IATA stocking density recommendations for sheep.

Table 36 in ASEL 3.2 is much more practical than the Calculation table and graph in IATA LAR, as the table in ASEL clearly specifies the minimum pen area required, in small liveweight increments, without the need to interpret a graph. IATA LAR would be enhanced if the Calculation Table and graph for sheep are replaced with a minimum pen area table similar to that in ASEL 3.2.

4.7. Stocking density – goats

4.7.1. ASEL

Table 34 in ASEL 3.2 specifies the minimum aircraft crate pen area for goats, by liveweight, with 1 kg increments for goats in the weight range 15-55 kg, then 5 kg increments from 55-100 kg.

Goats weighing 14 kg or less may only be exported with an approved *Miniature or light weight breed livestock management plan (ASEL Std 6.7.3)*. A management plan for goats weighing 14 kg or less presumably includes a minimum pen area per head agreed between the exporter and Department.

4.7.2. International requirements

IATA LAR and OIE TAHC do not have any stocking density recommendations for goats. An overseas exporter or jurisdiction relying solely on IATA LAR might apply the stocking density recommendations for sheep when loading goats. If so, the allocated pen space would be significantly greater than required in ASEL 3.2.

4.7.3. Alignment of stocking density requirements

ASEL 3.2 provides exporters with clear guidance on minimum pen area requirements for goats, which is not present in the international standards. IATA LAR would be enhanced if it included a minimum pen area table for goats in a similar format to that in ASEL 3.2.

4.8. IATA LAR requirements not included in ASEL

4.8.1. Compliance with IATA LAR by default

ASEL **Std 6.1.13** states that *‘Livestock exported by air must be exported in compliance with the IATA Live Animal Regulations. Where there is a variance between the IATA Live Animal Regulations and these standards, ASEL applies.’*

If a requirement in IATA LAR does not have a directly related or similar standard in ASEL, then an exporter must comply with IATA LAR. For example: ASEL does not have any standards relating to aircraft crate design, so by default, the aircraft crate specifications in IATA LAR are also ASEL requirements.

This section looks at key requirements in IATA LAR that are either not included in ASEL or are at variance with standard practice in Australia. There are significant differences between the IATA LAR container requirements for livestock and accepted industry practice in Australia. Some of these differences are of a purely commercial nature, but others have significant compliance and animal welfare implications.

4.8.2. Container requirements

Chapter 8 in IATA LAR has detailed container requirements for animals transported by air. There are four sections that relate to livestock:

- *General container requirements for domestic dogs and cats, farm livestock and farmed deer or antelope.* This section provides generic recommendations, with basic principles about aircraft crate design, ventilation, feeding and watering, labelling and marking, special care for vulnerable species and tranquilization.

- *Container Requirement 3 (CR 3)* applies when cattle, sheep, goats, antelope, deer, pigs and ponies are transported in bulk. It has species-specific recommendations and line drawings to illustrate suitable crate designs.
- *Container Requirement 73 (CR 73)* applies to a wide variety of domesticated and wild mammals, including alpaca and cattle, transported in a single or multiple animal container.
- *Container Requirement 74 (CR 74)* applies to a smaller range of mammals, including sheep and goats, transported in a single or multiple animal container.

The Container Requirement sections have line drawings to illustrate suitable crate designs, but with a caveat that the illustrations are examples only, and that containers which conform to the principles of the written standards but look slightly different are considered compliant with the IATA minimum standards.

CR 3 is the key IATA LAR reference for Australian livestock exports, as it covers cattle, sheep and goats transported in bulk.

4.8.3. Crate design

Construction materials

CR 3 requires a crate to be made of metal, hardwood, fibreglass or polythene sheeting. CR 73 requires a crate to be made of wood or metal, with rubber, burlap or canvas for padding and light reduction. CR 74 requires a crate to be made of wood, metal or other strong materials.

Softwood timber and veneer ply are frequently used to construct aircraft crates for livestock exported from Australia. They offer several significant advantages over other construction materials, including a lighter weight and lower material and labour costs for crate construction. Aircraft crates made with softwood timber and/or veneer ply have been well and truly proven as fit for purpose. However, they do not comply with CR 3 requirements. Moulded plastic is also being used in aircraft crate construction. It does not comply with CR 3 requirements either.

IATA LAR would be enhanced if it was amended to specify required crate construction outcomes (structural integrity, ventilation, leakproof, non-slip flooring etc.) and allow the use of any construction material that meets the required outcomes.

The different construction material requirement wording in CR 3, CR 73 and CR 74 is unfortunate.

Sides

CR 3 states that the crate sides must be... *'Solid up to a height that will prevent the escape of urine depending on the species and sex of the animals being carried. Above this height louvered or slatted sides are suitable but they must be constructed in such a manner that the animals cannot harm themselves and excreta cannot escape.'*

The CR 3 recommendation for solid sides is not reflected in the line drawing of a compliant wooden crate, which has ventilation openings above a 30 cm high kickboard. It also conflicts with another CR 3 recommendation that to allow noxious gases to escape, the container must be provided with openings in the lower half of the four walls, as well as higher up, on each and every deck.

CR 73 states *'Suitable plywood or similar material must closely line the frame to a level slightly above the animal's eye over which there must be a louvered or slatted area for ventilation extending to the roof.'*

CR 74 states.... *'The sides and door must be made of solid wood or similar material, constructed inside the framework. It must be close boarded to a height of 30 cm to prevent excreta escaping. It must be slatted above the close boarding to provide a smooth and strong interior. The slats must be spaced so that the animal cannot get its nose or legs through the openings between the slats but wide enough so that air can circulate freely.'*

The side wall recommendations in CR 3 and CR 73 are at odds with best practice ventilation design requirements. Carbon dioxide is heavier than air and sinks to the bottom of a crate. Ammonia gas is lighter than air, but in a high humidity environment forms vapours that are heavier than air and sink to the bottom of the crate. Ventilation openings are needed in the lower half of each tier of a livestock crate, to allow air flow through the crate (Hogan & Willis, 2009; Flynn et al. 2014).

Forklift spacers

CR 3 states that forklift spacers must be incorporated into the design of custom-built wooden crates. CR 73 and CR 74 both state that forklift extrusions must be provided if the total weight of the container plus animal exceeds 60 kg.

Whether or not forklift spacers are needed depends on how an aircraft crate is handled. In Australia, wooden livestock crates are often lifted by forklift when empty, but when loaded with livestock are rarely moved other than on a roller bed system, airport dolly or scissor lift. Forklift openings are not required.

If an aircraft crate loaded with livestock will be lifted onto or off a flat top truck overseas, fork openings that allow the crate to be lifted from the base, with weight borne by the floor joists and not the crate floor, are highly desirable. However, if livestock will be unloaded while the crate is still on its pallet base, such as directly into a truck or livestock holding facility at the airport, then provision for a forklift is not required.

If an aircraft crate loaded with livestock does not need to be lifted by forklift, there are significant benefits in constructing a crate without forklift spacers – lower material and labour costs for construction, lighter weight and more internal crate height. The use of aircraft livestock crates that do not have forklift spacers is common practice in Australia.

Forklift spacers should not be mandatory for all livestock crates. They should only be required for crates that will be lifted by forklift while loaded with livestock.

Ventilation

CR 3 states that ventilation openings must be provided and distributed equally over all four sides and per deck, and that the openings must be not less than 20% of the floor area per deck, but that sheep require more ventilation than other species – up to 40% of the floor area per deck. CR 3 also requires ventilation openings in the lower half of the four walls, as well as higher up on each and every deck.

The CR 3 ventilation requirements are broadly in line with best practice research findings (Hogan & Willis, 2009) and with standard practice in Australia, except that most livestock crates have less ventilation open space on the side with the door.

CR 3 does not specify a maximum size for ventilation openings. Openings in the crate sides must be small enough to prevent an animal putting a limb outside the crate, causing feet or leg injuries. Hogan & Willis (2009) recommend wall openings (distance between the rails or diameter of cut-outs) of 8 cm for sheep and goats, 11 cm for camelids and 13 cm for cattle.

CR 73 has ventilation specifications for close boarded containers. However, the CR 73 ventilation requirements are of little relevance as closed containers are not normally used to transport Australian livestock by air.

CR 74 simply states that ‘*Ventilation is provided by the slatted sides, ends and roof of the container spaced so that no part of the animal can protrude.*’ Standard practice in Australia is consistent with this recommendation, except that the crate sides may be solid ply with ventilation cut-outs rather than slats.

Floor

CR 3 requires the crate floor to be solid and leak-proof, with footholds and rubber bedding appropriate for the species.

CR 73 states that the crate floor must be solid and leak-proof, and that there must be either pegboard or slats bolted to the solid base to provide a firm foothold, and a droppings tray must be provided under the pegboard or slats to prevent excreta escaping.

CR 74 states the floor must be non-slip and may either be close boarded to form a solid base and covered with sufficient absorbent material to prevent any excreta escaping or made of peg board or slats over a leak-proof droppings tray.

The aircraft crates used to export Australian livestock typically have a solid floor with absorbent matting rather than footholds, peg board, slats, a droppings tray or rubber bedding.

Aircraft crates without a structural floor are also used to export Australian livestock, with good animal welfare outcomes. A crate without a structural floor cannot be lifted from its pallet base while there are animals inside, so can only be used if the livestock are unloaded from the crate still strapped to its pallet. A crate without a structural floor is more fragile, needs to be handled with great care, and must be strapped very securely to a pallet base. However, there are also significant advantages – lower material and labour costs for construction, a lighter weight, more internal crate height, slightly increased pen area and less crate material to be disposed of.

Some of the crate floor designs and materials currently used (very successfully) to export livestock from Australia are not compliant with IATA LAR requirements.

4.8.4. Temperature

Appendix C in IATA LAR is a table titled *Examples of acceptable ambient temperature ranges for live animals*. The ambient temperature ranges for cattle sheep and goats listed in IATA LAR Appendix C are shown in Table 10.

Dry bulb temperature (DBT) is a poor guide to the level of heat stress experienced by an animal. Humidity and wind speed are also critical factors (Le 2012, Marosszéky 2009). Wet bulb temperature is a much better guide to an animal’s thermal comfort. However, DBT not WBT is routinely monitored in an aircraft’s cargo holds during flight.

The acceptable temperatures in IATA LAR are significantly different from those recommended by Boeing (Le 2012). They are also inconsistent with temperatures observed on livestock flights from Australia, with good animal welfare outcomes.

Table 10 - IATA LAR Examples of acceptable ambient temperature ranges

Animal type	Minimum °C	Maximum °C	Remarks
Calf	12	25	
Beef cattle	-8 to +8	25	Minimum temperature is higher for smaller animals
Dairy cattle	-5	23	
Sheep	5 to 17	20	Minimum temperature is higher after shearing
Goats	0	25	

4.8.5. 24-hour phone contact

IATA LAR 1.2.1 states...*The shipper must provide a 24-hour phone number from where the carrier can obtain instructions from the shipper or their agent in the event of an emergency and the number is written on the air waybill.*

ASEL does not have a related standard, so this requirement only applies by default. If providing the carrier with a 24-hour emergency contact number was included in ASEL, it would have greater prominence.

4.8.6. Pen area in multi-tier crates

IATA LAR 8.2.1 states...*When calculating stocking density, the following variables must be taken into account – in two-tier penning, there is loss of floor area in the upper tier due to the contour of the aircraft and the overall height limitation.*

OIE TAHC has a similar requirement. **OIE TAHC 7.4.3.1 (b)** *When calculating stocking rates, the following should be taken into account – in narrow bodied aircraft, there is loss of floor area in the upper tier due to the contour of the aircraft.*

ASEL does not have a related standard, so consideration of the effective pen area in a contoured multi-tier crate only applies by default, and there are no firm requirements as to how the contour effect should be managed. There would be merit in providing clearer requirements.

5. Recommendations

5.1. Changes to ASEL 3.2

Table 11 lists recommended changes to ASEL 3.2 to achieve regulatory best practice for livestock exports by air, with animal welfare standards that are evidence based, address significant welfare risks, are fit-for-purpose and where possible aligned with international requirements, but with economic consequences and regulatory burden kept to a minimum. The changes suggested in Table 11 are listed in the order they occur in ASEL 3.2 and not in order of priority or consequence.

Table 11 - Recommended changes to ASEL 3.2

	Proposed change	Rationale and consequence
1	<p>Current ASEL Standard</p> <p>Std 6.1.11 <i>For livestock that are en-route or at the airport but required to return to an approved premise or other premises:</i></p> <p>a) <i>in addition to any requirements under the Land Transport Standards:</i></p> <p>i. <i>if the journey from premises departure to premise return exceeds 6 hours, the livestock must be unloaded, fed, watered, and rested for a minimum of 12 hours prior to being reloaded for transport; or</i></p> <p>ii. <i>if the journey from premises departure to premise return exceeds 12 hours, the livestock must be unloaded, fed, watered, and rested for a minimum of 24 hours prior to being reloaded for transport; and</i></p> <p>b) <i>the exporter must keep records of animal movements, time off food and water, and rest periods, and retain these for at least 2 years after the date of export.</i></p> <p>Recommended change</p> <p>Std 6.1.11 is deleted.</p>	<p>The Land Transport Standards were developed after extensive industry and community consultation. They are science based, with maximum water deprivation times and minimum rest times specified for all species covered by ASEL.</p> <p>The Land Transport Standards are widely accepted as good husbandry practice and have been incorporated into the animal welfare legislation in all Australian States and Territories.</p> <p>Std 6.1.9 requires compliance with the water deprivation and rest times in the Land Transport Standards. The benefits of additional requirements in Std 6.1.11 are not obvious.</p> <p>Livestock returned from an airport to an approved premises or alternative property because of delayed aircraft loading is a rare event. The flexibility to return animals to an approved premises or unload them somewhere close to the airport, in compliance with the Land Transport Standards and with the approval of the Department’s supervising veterinarian, without fear of further enforced delay, is likely to give the best animal welfare and commercial outcome. Requirements beyond those in the Land Transport Standards are not necessary.</p> <p>Economic impact: Greater commercial flexibility.</p> <p>Welfare risk: No change. Compliance with water deprivation and rest times in the Land Transport Standards is mandatory under Std 6.1.9.</p>

Proposed change		Rationale and consequence	
2	<p>Current ASEL Standard</p> <p>Std 6.1.13 <i>Livestock exported by air must be exported in compliance with the IATA Live Animal Regulations. Where there is variance between the IATA Live Animal Regulations and these standards, IATA applies.</i></p> <p>Recommended changes</p> <p>Std 6.1.13 is deleted and IATA LAR is instead listed in the preamble to ASEL Standard 6 as a reference document.</p>	<p>IATA is not a regulatory body and IATA LAR is not intended to be used for regulatory enforcement.</p> <p>IATA LAR provides guidance to IATA member airlines. It covers a wide range of species with a focus on safe handling of individual animals and small consignments rather than large consignments of livestock.</p> <p>There are recommendations in IATA LAR which are not included in ASEL (and hence are ASEL requirements by default) but are inconsistent with accepted best practice in Australia. Crate design and construction materials are good examples. Crate design technology has progressed well beyond current IATA LAR recommendations. Most of the aircraft crates used to export Australian livestock, with very good welfare outcomes, don't comply with IATA LAR requirements.</p> <p>Economic impact: A single, stand-alone set of Australian standards will provide greater certainty of export requirements and reduce regulatory burden.</p> <p>Welfare risk: No change.</p>	
3	<p>Current ASEL Standard</p> <p>Std 6.1.14 (c) <i>When calculating pen space allocation and penning livestock:</i></p> <p><i>c) the livestock must be able to stand normally, and once lying down should be able to regain their feet unaided and without undue interference from other animals.</i></p> <p>Recommended change</p> <p>Std 6.1.14 (c) is deleted.</p>	<p>Std 6.1.14 (c) duplicates what is already embedded in the ASEL minimum pen area requirements. Compliance with the minimum aircraft crate pen area tables in ASEL allows livestock to stand normally, and once lying down they should be able to regain their feet unaided and without undue interference from other animals.</p> <p>Std 6.1.14 (c) is unnecessary.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>	

Proposed change		Rationale and consequence	
4	<p>Current ASEL Standard</p> <p>Std 6.1.14 (d) <i>When calculating pen space allocation and penning livestock:</i></p> <p><i>d) when livestock stand normally, no part of the animal's body (including horns) must touch any overhead part of the crate including any supporting crossbars.</i></p> <p>Recommended change</p> <p>Std 6.1.14 (d) is amended to read:</p> <p><i>When calculating pen space allocation and penning livestock:</i></p> <p><i>d) no part of the animal's body may touch any overhead part of the crate including any supporting crossbars. There must be clearance above the shoulder or loin, whichever is highest, of least 10 cm for sheep and goats and at least 20 cm for cattle and buffalo.</i></p>	<p>The words 'when livestock stand normally' are ambiguous, as the normal position for a grazing animal can be interpreted as head down or head up.</p> <p>This amendment provides greater clarity of requirements, with wording that aligns more closely with IATA LAR.</p> <p>Economic impact: Greater certainty of decision-making, otherwise no change.</p> <p>Welfare risk: Slightly enhanced animal welfare.</p>	
5	<p>Current ASEL Standard</p> <p>Std 6.1.14 (e) <i>When calculating pen space allocation and penning livestock:</i></p> <p><i>e) expected ambient temperatures and ventilation capacity at loading, transits, transhipments and unloading must be taken into account.</i></p> <p>Recommended change</p> <p>Std 6.1.14 (e) is deleted.</p>	<p>Environmental control on an aircraft is critically important to the wellbeing of the livestock on board. However, Std 6.1.14 (e) is poorly crafted regulation as temperature and ventilation capacity requirements are not specified, nor does this standard specify what outcome is required. With its current wording, Std 6.1.14 (e) is not enforceable.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p> <p><i>Note:</i> Recommendation 10 below provides for temperature monitoring that is not currently required in ASEL 3.2.</p>	

Proposed change		Rationale and consequence
6	<p>Current ASEL Standard</p> <p>Std 6.1.14 (i) <i>When calculating pen space allocation and penning livestock:</i></p> <p><i>i) when livestock are loaded with mixed cargo in aircraft lower holds, the pen area must be increased by 10% (cumulative with other requirements in Standards 6.2 to 6.10).</i></p> <p>Recommended change</p> <p>Std 6.1.14 (i) is amended to read:</p> <p><i>i) when livestock are loaded with mixed cargo in an aircraft lower hold, the exporter must provide the aircraft loadmaster with written instructions that include ensuring the non-livestock cargo does not restrict air flow through and over the livestock crates.</i></p>	<p>The current ASEL requirement for extra pen space does not address the key risk factor, which is obstructed air flow, not stocking density. Risk management involves (a) crate design that allows air to flow freely through the crate; and (b) load planning to ensure that air flow through livestock crates in a lower aircraft cargo hold is not obstructed by other cargo.</p> <p>Economic impact: Slight positive. 10% extra pen space is no longer required for livestock loaded with mixed cargo in a lower cargo hold.</p> <p>Welfare risk: Enhanced animal welfare. The increase in animal welfare risk by removing the 10% extra space requirement is offset by requiring the exporter to provide the aircraft loadmaster with written instructions that flag the risk of restricted air flow with a mixed cargo. Obstructed air flow is the key welfare risk.</p>
7	<p>Current ASEL Standard</p> <p>Std 6.1.15 <i>Pen space allocation and penning arrangements must conform to Standard 6.1.14 and the relevant species specifications in Standards 6.2 to 6.10 and with any relevant requirements, and applicable legislation. The exporter must comply with directions from an authorised officer in relation to pen space allocation to remove an animal or animals from a crate to ensure animal health and welfare and compliance with these standards.</i></p> <p>Recommended change</p> <p>Std 6.1.15 is deleted.</p>	<p>ASEL sets minimum animal health and welfare standards across the livestock export supply chain, including pen space allocation by species. Compliance with ASEL is mandatory.</p> <p>An exporter must comply with all reasonable directions from an authorised officer regarding compliance with ASEL, not just in relation to pen space. Std 6.1.15 is unnecessary.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>

Proposed change		Rationale and consequence	
8	<p>Current ASEL Standard</p> <p>Std 6.1.19 <i>Female livestock must not be treated with a prostaglandin drug:</i></p> <p>a) <i>within the 60 day period prior to export unless they have been pregnancy tested immediately before prostaglandin treatment and declared to be in the first trimester of pregnancy or not detectably pregnant; nor</i></p> <p>b) <i>within 14 days prior to export.</i></p> <p>Recommended change</p> <p>Std 6.1.19 is deleted.</p>	<p>ASEL restrictions on prostaglandin treatment were introduced to manage welfare risks for feeder heifers exported by sea – as adequate care could not be guaranteed in a shipboard environment for cattle with metritis secondary to prostaglandin induced abortion. This is not an issue of concern for cattle exported by air.</p> <p>Std 6.5.4 provides separate assurance that feeder and slaughter cattle exported by air are not detectably pregnant.</p> <p>Economic impact: Reduced regulatory burden for a standard not relevant to air freight.</p> <p>Welfare risk: No change.</p>	
9	<p>Current ASEL Standard</p> <p>Std 6.1.26 (b) <i>Livestock must be checked by a competent stock handler appointed by the exporter to ensure they remain healthy and fit to travel for all flights:</i></p> <p>b) <i>if there is a competent stock handler travelling on the flight, and where feasible:</i></p> <p>i) <i>within 60 minutes of commencement of the flight; and</i></p> <p>ii) <i>at least every 3 hours during the flight.</i></p> <p>Recommended change</p> <p>Std 6.1.26 (b) is deleted.</p>	<p>Livestock in a lower cargo hold are not accessible and cannot be physically inspected during flight.</p> <p>Livestock crates on a freighter main deck can be inspected during flight, but this should be kept to a minimum for animal welfare and workplace safety reasons:</p> <ul style="list-style-type: none"> • Entry to the main deck of a freighter during flight is a safety risk if there is turbulence (no safety belt), loss of pressure (no oxygen, unless a portable oxygen supply is taken in), no buddy support and minimal lighting. • Access to livestock in a netted crate is severely restricted and it is not safe to open a crate or put your arm through. • During flight, stress on the livestock is least if they are left quietly alone with lights dimmed. <p>Economic impact: Nil.</p> <p>Welfare risk: Enhanced animal welfare, by deleting a standard that is contrary to accepted industry best practice.</p>	

Proposed change		Rationale and consequence
10	<p>A new standard is added to ASEL requiring temperature monitoring during the flight, including transit stops, as follows:</p> <p><i>Where there is a stock attendant travelling on the flight,</i></p> <p>a) <i>the temperature in each cargo hold with livestock must be checked:</i></p> <p>i. <i>30 minutes into the flight;</i></p> <p>ii. <i>one hour into the flight;</i></p> <p>iii. <i>two hours into the flight; and</i></p> <p>iv. <i>at least once every two hours thereafter; and</i></p> <p>b) <i>the crew must be requested to alert the stock attendant if at any time during the flight a cargo hold with livestock reaches a dry bulb threshold temperature of 30°C.</i></p>	<p>Environmental control on an aircraft is critically important to the wellbeing of the livestock on board. Ventilation failure resulting in suffocation and/or heat stress is the most significant welfare risk for livestock transported by air. This recommendation is for a new ASEL standard to mitigate this risk.</p> <p>Economic impact: Minimal. Some additional temperature monitoring is required.</p> <p>Welfare risk: Enhanced risk mitigation, from more intensive temperature monitoring.</p>
11	<p>Current ASEL Standard</p> <p>Std 6.1.28 <i>Feed and water must be provided to livestock while in transit if climatic conditions, species, class of livestock or total air export journey time warrant.</i></p> <p>Recommended change</p> <p>Std 6.1.28 is deleted.</p>	<p>Std 6.1.9 requires compliance with water deprivation times in the Land Transport Standards. If the Land Transport Standards are met, the benefits of the additional requirements in Std 6.1.28 are not obvious.</p> <p>Std 6.1.28 is poorly crafted regulation, as the circumstances (climatic conditions, species, class of livestock and/or journey time) where feed and water must be provided in transit are not clearly specified.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>
12	<p>Current ASEL Standard</p> <p>Std 6.1.30 <i>The ventilation and temperature in the livestock hold must be adequate to maintain the health and welfare of the livestock at all times while livestock are in the aircraft.</i></p> <p>Recommended change</p> <p>Std 6.1.30 is deleted.</p>	<p>Environmental control during the flight, (including transit stops), is critically important. However, Std 6.1.30 is poorly crafted regulation as it does not specify what is ‘adequate’ ventilation and/or temperature, what outcome is required or what an exporter is expected to do.</p> <p>Economic impact: Reduced regulatory burden. The current regulatory requirement is unclear and unenforceable.</p> <p>Welfare risk: No change.</p>

Proposed change		Rationale and consequence
13	<p>Current ASEL Standard</p> <p>Std 6.5.2 (b) <i>Cattle sourced for export must have an individual liveweight of between 150 kg and 650 kg (inclusive). Animals outside these weights must not be sourced for export or exported, unless:</i></p> <p><i>b) for cattle weighing more than 650 kg, otherwise provided in a heavy cattle management plan approved in writing by the department.</i></p> <p>Recommended change</p> <p>Std 6.5.2 (b) is amended to read:</p> <p><i>Cattle sourced for export must have an individual liveweight of between 150 kg and 1,000 kg (inclusive). Animals outside these weights must not be sourced for export or exported, unless:</i></p> <p><i>b) for cattle weighing more than 1,000 kg, otherwise provided in a heavy cattle management plan approved in writing by the department.</i></p>	<p>A ‘heavy cattle management plan’ is appropriate for cattle 650 kg plus exported by sea – they are more liable to injury from slipping over on a wet deck, more prone to lameness from standing on a hard deck for many days, may be difficult to move up and down the ship’s ramps, and are at greater risk of heat stress during the voyage.</p> <p>These risks do not apply to cattle exported by air – where crates have soft, absorbent bedding, there are no ramps for the cattle to go up or down, and there is a much shorter travel time.</p> <p>There is no known history of welfare problems with heavy cattle exported from Australia by air. Rather, there is a history of very good welfare outcomes. However, with very heavy cattle a strengthened crate may be required.</p> <p>The requirement for a ‘heavy cattle management plan’ for cattle weighing over 650 kg seems to have been derived from the ASEL Standards for sea freight. It does not address a significant animal welfare risk for cattle exported by air.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>

	Proposed change	Rationale and consequence
14	<p>Current ASEL Standard</p> <p>Std 6.5.3 <i>Cattle must not be sourced for export or exported unless they have been assessed by a competent stock handler against the non-dairy breed cattle body condition scoring Table 29 or dairy breed cattle body condition scoring in Figure 5 and have a body condition score of:</i></p> <p>a) <i>for non-dairy breed cattle, 2 or more but less than 5 (on a scale of 0 to 5); and</i></p> <p>b) <i>for dairy breed cattle, 3.5 or more but less than 5.5 (on a scale of 1 to 8).</i></p> <p>Std 6.5.3 is supported by a table and two figures that provide details about assessing cattle body condition score.</p> <ul style="list-style-type: none"> • Table 29 Non-dairy breed cattle body condition score • Figure 4 Visual aid for assisting with body condition scoring of non-dairy breed cattle • Figure 5 Dairy breed cattle body condition score (diagram shows 3 - 6 on scale of 1-8) <p>Recommended change</p> <p>Std 6.5.3, Table 29 and Figures 4 and 5 are deleted.</p>	<p>Std 6.5.3 is similar to Std 1.4.4 for cattle exported by sea, but with a minor change, allowing non-dairy breeds in condition score 4.5 to be exported by air.</p> <p>There are sound reasons to restrict sea shipment of cattle in very light condition (less competitive at the feed trough) and in very fat condition (greater risk of heat stress). These are not welfare concerns for cattle exported by air.</p> <p>Most of the Australian cattle exported by air are dairy heifers. Body condition scoring has limited application for dairy heifers, as condition scoring principally measures subcutaneous fat and relatively little subcutaneous fat is laid down during a heifer’s active growth phase.</p> <p>Std 6.5.3 is not strictly enforced. Limiting the export of dairy cattle to animals with a condition score of 3.5 to 5 (on a scale of 1 to 8), would be quite restrictive.</p> <p>The welfare risks (if any) of exporting cattle by air in light or fat condition are mitigated by the freight costs and commercial imperative to deliver quality animals.</p> <p>There is no known history of welfare concerns with cattle in light or fat condition exported from Australia by air.</p> <p>Economic impact: Reduced regulatory burden and an expanded pool of cattle that meet ASEL specifications for export by air.</p> <p>Welfare risk: No change.</p>

Proposed change		Rationale and consequence
15	<p>Current ASEL Standard</p> <p>Table 30 Minimum aircraft crate pen area for cattle exported by air</p> <p>Recommended changes</p> <ul style="list-style-type: none"> • Table 30 is extended to include cattle with a liveweight up to and including 1,000 kg; and • the minimum pen area requirements for cattle are those that previously applied in ASEL 2.3. 	<p>Expanding Table 30 to include cattle weighing up to 1,000 kg will provide greater clarity of pen area requirements for cattle weighing over 650 kg.</p> <p>Economic impact: Greater certainty of decision-making, otherwise no change.</p> <p>Welfare risk: No change.</p>
16	<p>Current ASEL Standard</p> <p>Std 6.7.4 <i>Goats must not be sourced for export or exported unless they have been assessed by a competent stock handler against the goat body condition scoring in Table 33 and have a body condition score of 2 or more but less than 4 (on a scale of 1 to 5).</i></p> <p>Recommended change</p> <p>Std 6.7.4 is amended to read:</p> <p><i>Goats must not be sourced for export or exported unless they have been assessed by a competent stock handler against the goat body condition scoring in Table 33 and have a body condition score of 2 or more (on a scale of 1 to 5).</i></p>	<p>There is merit in restricting the export of very lean goats that have few energy reserves for the stresses of handling, transport and time off feed. This is a potential concern for slaughter goats (especially rangeland goats) exported by air. With breeder goats the commercial imperative to deliver animals fit for purpose mitigates the risk of exporting emaciated animals.</p> <p>There are no obvious welfare reasons to restrict export by air of goats with condition score 4 or more.</p> <p>An upper limit of condition score 3.5 (on a scale of 1 to 5) for goats exported by air is very restrictive – for no obvious animal welfare benefit.</p> <p>Economic impact: Reduced regulatory burden and an expanded pool of goats that meet ASEL specifications for export by air.</p> <p>Welfare risk: No change.</p>

	Proposed change	Rationale and consequence
17	<p>Current ASEL Standard</p> <p>Std 6.9.3 <i>Sheep must not be sourced for export or exported unless they have been assessed by a competent stock handler against the sheep body condition scores in Table 35 and have a body condition score of 2 or more but less than 4 (on a scale of 1 to 5).</i></p> <p>Recommended change</p> <p>Std 6.9.3 is amended to read:</p> <p><i>Sheep must not be sourced for export or exported unless they have been assessed by a competent stock handler against the sheep body condition scores in Table 35 and have a body condition score of 2 or more (on a scale of 1 to 5).</i></p>	<p>There is merit in restricting the export of very lean sheep that have few energy reserves for the stresses of handling, transport and time off feed. This is a potential welfare issue for slaughter sheep exported by air. With breeder sheep the commercial imperative to deliver animals fit for purpose mitigates the welfare risk of exporting emaciated animals.</p> <p>Sheep with condition score 4 or more have a higher risk of death from ‘failure to eat’ syndrome when exported by sea. They are also more susceptible to heat stress. However, these are not issues of concern for sheep exported by air. There are no obvious welfare reasons to restrict the export by air of sheep in condition score 4 or greater.</p> <p>An upper limit of condition score 3.5 (on a scale of 1 to 5) for sheep exported by air is very restrictive – for no obvious animal welfare benefit.</p> <p>Economic impact: Reduced regulatory burden and an expanded pool of sheep that meet ASEL specifications for export by air.</p> <p>Welfare risk: No change.</p>
18	<p>Current ASEL Standard</p> <p>Std 6.9.6 <i>Sheep with horns must only be sourced for export or exported if the horns:</i></p> <ul style="list-style-type: none"> a) <i>would not cause damage to the head or eyes of the animal or other animals; and</i> b) <i>would not endanger other animals during transport; and</i> c) <i>would not restrict access to feed or water during transport; and</i> d) <i>are no longer than 1 full curl, unless otherwise provided in a long-horned livestock management plan approved in writing by the department.</i> <p>Recommended change</p> <p>Std 6.9.6 is deleted.</p>	<p>There are very few injuries to the head or eyes of other animals in a mob of horned sheep, due to behavioural self-protection.</p> <p>It is not clear how an exporter consigning horned sheep for export by air could demonstrate compliance with Stds 6.9.6 a & b.</p> <p>Std 6.9.6 d is similar to Std 1.7.7 for sheep exported by sea. The requirement that sheep have horns no more than one full curl reduces the risk of sheep getting their horns entangled in railing and/or not being able to access feed and water troughs at sea. These are not issues of concern for sheep exported by air.</p> <p>Economic impact: Reduced regulatory burden by deleting requirements that are not clearly defined and have little relevance to air freight.</p> <p>Welfare risk: No change.</p>

Proposed change		Rationale and consequence
19	<p>A new standard is added to ASEL as follows:</p> <p><i>The exporter must:</i></p> <p>a) <i>provide the airline with a 24-hour phone number which allows the airline to obtain instructions from the exporter or exporter’s representative in the event of an emergency; and</i></p> <p>b) <i>the 24-hour emergency contact number must be written on the air waybill.</i></p>	<p>This proposed new ASEL standard simply embeds an existing IATA LAR requirement into ASEL.</p> <p>Economic impact: Nil.</p> <p>Welfare risk: Enhanced risk mitigation. The proposed change ensures the airline can contact the exporter if required in an emergency.</p>

5.2. Changes to LIVEXCollect

Table 12 - Recommended changes to the LIVEXCollect End-of-Journey report

Proposed change		Rationale and consequence
20	<p>The requirement to collect and record the minimum and maximum wet bulb temperature (WBT) where livestock crates are held prior to aircraft loading is deleted.</p>	<p>Aircraft crates loaded with livestock are generally parked ‘airside’ - in an area where access is restricted to ASIC holders or persons accompanied by someone with an ASIC pass.</p> <p>Loading livestock into crates at the airport is a critical phase of the live export process. Safely transferring livestock from truck to crate, ensuring animal comfort and appropriate stocking density, minimizing handling stress and preventing injuries and escapes should be the exporter’s focus of attention. Multiple trips airside to record WBT is an unnecessary diversion.</p> <p>There is no reason to believe that WBT is a welfare concern for livestock in crates prior to loading on the aircraft.</p> <p>If required, historical temperature and humidity data at Australian airports is available from the Bureau of Meteorology.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>

Proposed change		Rationale and consequence
21	The Health report sheet is deleted.	<p>The data required is not relevant to air freight and there is no reasonable prospect of interpreting the data in a meaningful way.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>
22	The Birth and abortion sheet is deleted.	<p>The data required is not relevant to air freight and there is no reasonable prospect of interpreting the data in a meaningful way.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>
23	Columns M-S on the Mortality records sheet are deleted.	<p>The data required is not relevant to air freight and there is no reasonable prospect of interpreting the data in a meaningful way.</p> <p>Economic impact: Reduced regulatory burden.</p> <p>Welfare risk: No change.</p>

5.3. Changes to IATA Live Animal Regulations

The IATA Live Animals and Perishables Board (LAPB), a sub-section of IATA, is custodian of the IATA Live Animals Regulations with responsibility for keeping them up to date. There are eleven IATA member airlines on the Board.

LAPB receives technical advice from:

- an LAPB Advisory Group of representatives from organisations with an interest in animal transportation; and
- an LAPB Animal Care Team of individuals with expertise in animal transportation.

The amendments to IATA LAR proposed in Table 13 reflect current industry best practice for air transportation of cattle, sheep and goats. They are not listed in order of priority or consequence.

The proposed changes should be forwarded to LAPB, for consideration by the LAPB Advisory Group and Animal Welfare Team, with changes incorporated in the next version of IATA LAR.

Table 13 - Recommended changes to IATA LAR

Proposed change		Rationale and consequence
24	<p>Stocking density – cattle</p> <p>The stocking density calculation table and space/weight graph for cattle are replaced by a recommended minimum pen area table for cattle, in the same format and with the same pen areas as ASEL 2.3, with a body weight range from 150-1,000 kg.</p>	<p>Large numbers of cattle have been exported from Australia by air, using the cattle stocking density tables in ASEL, with good welfare outcomes.</p> <p>A table with small body weight increments is much easier to use, with less chance of error, than interpreting a graph.</p> <p>The IATA LAR calculation table should be expanded to include cattle in the weight range 150-1,000 kg.</p>
25	<p>Stocking density – sheep</p> <p>The stocking density calculation table and space/weight graph for sheep are replaced by a recommended minimum pen area table for sheep, in the same format and with the same pen areas as ASEL 3.2.</p>	<p>Large numbers of sheep have been exported from Australia by air, using the sheep stocking density table in ASEL, with good welfare outcomes.</p> <p>A table with small body weight increments is much easier to use, with less chance of error, than interpreting a graph.</p> <p>The IATA LAR calculation table and space / weight graph have an upper body weight of 70 kg. The recommendations should be expanded to include sheep weighing up to 100 kg.</p>
26	<p>Stocking density – goats</p> <p>A recommended minimum pen area table for goats is added to IATA LAR, in the same format and with the same pen areas as ASEL 3.2.</p>	<p>IATA LAR does not currently have stocking density recommendations for goats.</p> <p>Large numbers of goats have been exported from Australia by air, using the goat stocking density table in ASEL 3.2, with good welfare outcomes.</p> <p>A table with small body weight increments is much easier to use, with less chance of error, than interpreting a graph.</p>
27	<p>Recommended temperature ranges</p> <p>Appendix C in IATA LAR is deleted.</p>	<p>Dry bulb temperature (DBT) is a poor guide to an animal’s thermal comfort. Humidity and wind speed are also critical factors.</p> <p>The acceptable temperatures in IATA LAR Appendix C are significantly different from those recommended by Boeing and are inconsistent with temperatures observed on livestock flights from Australia, with good animal welfare outcomes.</p>

Proposed change		Rationale and consequence
28	<p>Container construction materials</p> <p>Container requirements 3, 73 and 74 are amended to allow the use of any construction material that meets the required outcomes (structural integrity, ventilation, leakproof, non-slip floor etc.)</p>	<p>Softwood timber and veneer ply are extensively used to construct livestock crates in Australia. They offer significant advantages over other construction materials - lighter weight and lower material and labour costs for crate construction. Aircraft crates made with softwood timber and/or veneer ply have been well and truly proven as fit for purpose, but they do not comply with CR 3 requirements.</p> <p>Moulded plastic is also being used in aircraft crate construction.</p> <p>The construction materials specified in IATA LAR stifle innovation and do not reflect current industry practice.</p>
29	<p>Container side walls</p> <p>The container side wall requirements in CR 3 and CR 74 are amended to remove the inconsistency between side wall and ventilation recommendations. The side wall text should say that ventilation openings must be provided in the lower half of each tier of the crate.</p>	<p>The side wall recommendations in CR 3 and CR 73 are at odds with best practice ventilation design requirements. Ventilation openings are needed in the lower half of each tier of a livestock crate, to allow air flow through the crate.</p>
30	<p>Forklift spacers</p> <p>Forklift spacers are only required for aircraft crates that will be lifted by forklift while loaded with livestock.</p>	<p>Aircraft crates that are not going to be lifted by forklift when loaded with livestock do not need forklift spacers.</p> <p>If forklift spacers are not required, there are significant cost, weight and height advantages of not including forklift spacers in the design of custom-built, timber livestock crates.</p> <p>Large numbers of livestock have been exported from Australia in crates without forklift spacers – with very good animal welfare outcomes.</p>
31	<p>Size of ventilation openings</p> <p>A new recommendation is added to CR 3, that the maximum size for ventilation openings in the lower half of each tier on a livestock crate is 8 cm for sheep and goats, 11 cm for camelids and 13 cm for cattle (distance between the rails or diameter of cut-outs).</p>	<p>CR 3 does not currently specify a maximum size for ventilation openings in the crate sides. They must be small enough to prevent an animal putting a limb outside the crate, causing feet or leg injuries. The recommended maximum size for wall openings is 8 cm for sheep and goats, 11 cm for camelids and 13 cm for cattle.</p>

Proposed change		Rationale and consequence
32	<p>Crate floor</p> <p>The CR 3 crate floor requirements should be rewritten to reflect current industry practice:</p> <ul style="list-style-type: none"> • A solid structural floor is not essential if the crate will be unloaded while still strapped to its pallet base (such as into a truck or holding facility at the destination airport). • A leak-proof crate floor is essential. • The crate must have non-slip flooring, but it does not need to be footholds and/or rubber matting. 	<p>CR 3 requires the crate floor to be solid and leak-proof, with footholds and rubber bedding appropriate for the species.</p> <p>The aircraft crates used to export Australian livestock typically have a solid floor with absorbent matting rather than footholds and rubber bedding.</p> <p>Aircraft crates without a structural floor are also used, with good animal welfare outcomes. A crate without a structural floor must be unloaded while still strapped to its pallet base, is more fragile and must be handled with great care. However, there are also significant advantages – lower material and labour costs for construction, a lighter weight, and more internal crate height.</p> <p>The crate floor designs and materials currently used (very successfully) to export livestock from Australia are not compliant with IATA LAR requirements.</p>
33	<p>Feed and water</p> <p>IATA LAR feeding and watering recommendations for ruminants need updating, to recognize the benefits of a feed and water curfew before transportation.</p>	<p>IATA LAR does not currently recognize the benefits of a feed and water curfew for ruminant species before transportation – less risk of injury, less soiling of the aircraft crates (and hence less risk of effluent spillage into the aircraft), cleaner animals at discharge and less ammonia production in the confines of the aircraft hold during flight.</p>

6. Conclusions

6.1. Key findings

This project examined the Australian and international animal welfare standards for cattle, sheep and goats transported by air, to determine the evidence base for current requirements, areas of regulatory non-alignment, and the appropriateness of current Australian standards in a risk management context.

Air freight is a small, highly specialised segment of the livestock export industry, with a history of very good animal welfare outcomes. Over the last few years, delivery success rates for cattle, sheep and goats exported by air have consistently been well in excess of 99.9%.

Regulatory best practice is about prudent risk management. Regulatory standards should target significant risks, be evidence-based, clearly defined, not unduly complex, not cause adverse or unintended side effects, not cause excessive or unnecessary compliance costs, and be in harmony across the industry's domestic and international operations. They must also be enforceable.

Expectations of 'good' regulation vary. In general, the Australian community expects animal welfare to be a prime consideration for the livestock export industry, with a high-performance bar and enforceable regulatory standards. A key policy driver for government is the need to avoid an animal welfare incident, or series of incidents, which rekindle community protests about the livestock export trade. Concern about the consequences of a welfare incident, and the need to protect both government and industry from community backlash, has encouraged a strongly risk-averse approach to industry regulation. The livestock export industry would like to operate as freely as possible, with consistently good welfare outcomes but without unnecessary or excessive restrictions, compliance costs or regulatory burden.

ASEL Standard 6 (*Air transport of livestock*) has more detailed regulatory requirements than apply in any other international jurisdiction. However, many of the requirements in ASEL Standard 6 are based on experience with livestock transported by sea and do not address a significant animal welfare risk for livestock exported by air. This places Australian livestock air freight exporters at a commercial disadvantage relative to their overseas competitors, for little if any animal welfare benefit.

LIVEXCollect End-of-Journey reporting requirements are also ASEL requirements. The LIVEXCollect End-of-Journey report for air freight has largely been derived from the daily and end-of-voyage reports for livestock exported by sea. It is not 'fit-for-purpose' for air freight. Much of the data required is not relevant to air freight and there is no reasonable prospect of interpreting the data in a meaningful way.

With modest changes to ASEL and LIVEXCollect, there is considerable scope to reduce regulatory burden and costs for the industry without compromising animal welfare.

6.2. Benefits to industry

The Department of Agriculture, Fisheries & Forestry has committed to undertaking a regular review of the ASEL standards, to ensure they are fit for purpose, based on science and regulatory best practice. This project provides a strong case for change, with significantly reduced regulatory burden, without compromising animal welfare.

The next phase for this report is advocacy by the industry, to fast track a review of the ASEL standards and LIVEXCollect reporting requirements for livestock exported by air, and for IATA to incorporate accepted best practice procedures for air transport of cattle, sheep and goats in the next Live *IATA Live Animal Regulations* update.

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