

# Nut in shell (NIS) product quality standard



## 1. Certificated HACCP system

Each processor must have a third party certified HACCP system in place. The system must be certified by a registered accredited certification body.

## 2. Approved supplier program

All nut-in-shell (NIS) suppliers of certified processors must have in place a food safety based approved supplier program that is 2nd or 3rd Party audited.

## 3. Country of origin

All macadamia nuts sold under the AMS product quality standard must be Australian grown.

## 4. Nut in shell storage and handling

- Prior to being dried to final target moisture levels, NIS must be stored by the processor in conditions that provide forced ventilation.
- NIS must be dried to less than 7.5% moisture within 14 days following intake.
- NIS held in ambient conditions should be processed within 90 days.
- NIS held for longer than 90 days must be stored in a temperature-controlled environment at <15 °C for up to 270 days
- or alternative validated process that is proven to not adversely affect kernel quality.

The maximum recommended temperature cycle for drying macadamias is:

5-7 days at	32 °C
1-2 days at	38 °C
1-2 days at	44 °C
Finish drying at	50 °C

(Mason 1983a)

## 5. NIS classification and labelling

### 5.1 Standard description format

This standard requires that the product be descriptively labelled using the following terminology or abbreviation:

- NIS
- Size range in mm

Eg NIS 21-23mm

Unless otherwise defined the size ranges stated will be understood to indicate that product will pass over a smaller round screen (with size expressed in mm diameter) and pass through a larger round screen (with size expressed in mm diameter). Alternative sizing methods may be used but must obtain equivalent sizing to that achieved by passing over a round screen. Size range in mm with a 10% tolerance for over or under sized NIS.

# Nut in shell (NIS) product quality standard

## 6. NIS (kernel) retention strategies

Retention samples of kernel from NIS testing must be retained for each batch of product packed (lot size must not exceed the limits defined in point 7b) under the recommended storage conditions of the finished product and for the shelf life of the product in packaging that will protect the integrity of the product for the intended test purpose.

## 7. Physical kernel specifications at the point of packing

**a:** Macadamia NIS must meet the acceptable limits for kernel moisture, appearance, taste, foreign material, shell and defective kernel as set out in Table 2.

Table 2. Physical kernel specifications

	NIS
Kernel moisture content	Not to exceed 1.8%
Appearance of NIS	Brown in colour.  The shell should be intact (ie no visible kernel). Superficial cracks or slight superficial damage are not considered as defects.  The shell should be clean and free of any visible foreign matter, including husk.  Free from live infestation.
Appearance and taste of kernel	White/cream in colour or as specified for roasted product  Free from excessive dust or oil  Crunchy texture (excluding meal) with a typical macadamia flavour  Free from off odours and flavours
Foreign matter*	Target nil
Loose / broken shell**	Not more than 1% by weight
Sound kernel % (Premium and Commercial grade kernel)***	As per customer's agreed specification range or limit.  Sound kernel % (SKR) is calculated by  $(\text{Sound kernel weight g} / \text{NIS sample weight g}) = \text{SKR}\%$
Unsound kernel % (Reject kernel)***	As per customer's agreed specification range or limit.  Unsound kernel % (USKR) is calculated by:  $(\text{Reject kernel weight g} / \text{NIS sample weight g}) = \text{USKR}\%$  (An approximate calculation to convert USKR% to a Reject NIS Count method is to multiply the Unsound kernel % by 3. Eg USKR% of 2% x 3 = an approximate Reject NIS Count of 6%)
Visible mould	Target nil

Definitions

\*Foreign Matter includes any product that is not kernel and/or shell.

\*\*Loose shell is defined as pieces of shell greater than 3 mm in diameter x 2 mm thick

\*\*\*The definitions for Premium, Commercial and Reject grade kernel can be found in the Australian Macadamia Society Kernel Classification guide.

**b:** Sampling. All products must be representatively sampled and tested at packing. Lot size for this purpose shall not exceed 5 tonnes of NIS for each SKR% / USKR% test.

# Nut in shell (NIS) product quality standard

## 8. Agrichemical residue testing

Each processor must participate in the Australian macadamia industry National Residue Survey testing program (NRS).

All macadamia product sold under the AMS standard must comply with maximum residue limits for agricultural chemicals as published in the Food Standards Code.

All products must conform to importing country's maximum residue levels (MRL) for agricultural chemicals.

## 9. Bulk packaging specifications for NIS

All macadamia NIS sold under the AMS quality standard must be packaged in clean packaging material if used. This can be in the form of cartons, pouch in carton or poly woven bags. NIS may also be supplied in bulk.

## 10. Packing and labelling of finished kernel product

All packaging must comply with regulatory standards. It is recommended that all bulk packaging display the following information:

- Packer or seller's name, address and contact details
- Country of origin
- Product code
- Lot code or unique code
- Net weight
- Recommended storage conditions

## 11. Final product storage

Storage should be in conditions that preserve quality and prevent insect infestation.

It is recommended that finished product be stored under suitable climate-controlled conditions prior to dispatch to the customer. The recommended maximum temperature for storage of macadamia NIS (kernel) is 12 °C.

## 12. Shelf life standards

Table 3. Shelf life guidelines for NIS (kernel component)

Pack size	Peroxide value at packing	Barrier properties of packaging*	Residual oxygen	Recommended storage	Best before date
Up to 25 kg Vacuum packed gas flushed	≤ 2 meq/kg	Oxygen – <0.10 cm <sup>3</sup> /m <sup>2</sup> /24h  Water – <0.25 g/m <sup>2</sup> /24 h	≤ 2%	≤12 °C	24 months from pack date
Loose bulk or packed with no gas barrier.	≤ 2 meq/kg	Nil barrier properties	Atmosphere	≤12 °C	12 months from pack date

\*(at 25 °C, 75%RH, 1 atm)

## 13. NIS specification sheets

Processors must have a product specification sheet for each product sold under the AMS product quality standard which must contain the following:

- Product code
- Product size details
- Description of acceptable taste and aroma
- Maximum acceptable moisture content
- Minimum level (or range) of sound kernel recovery (SKR%)
- Maximum levels of reject kernel recovery (USKR%) and foreign material
- Description of the pack date, shelf life and/or best before date
- Recommended storage conditions

## 14. Product traceability

All finished product must have complete traceability back to a group of growers.

### Bibliography

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