



ANNEX: PROPOSED INTERNATIONAL MACADAMIA SPECIFICATION (Raw Kernel)

Raw Kernel Standards	Proposed International Standard	Comments
Moisture Content	1.5% +/- 0.2%	
Peroxide Value	3 meq/kg	
Free Fatty Acid	Max 0.5	
Aflatoxin total	Max 4ppb	
Aflatoxin B1	Max 2ppb	
Chemical residues	As per importing countries food standards	
Total Plate Count	Less than 30,000 cfu/g	
Yeast & Mould	Less than 20,000 cfu/g, No visible mould	
E.Coli	Less than 3 per gm (using MPN method) or not detected using triplicate tube method. Less than 3 cfu/g using ISO 16649-2	Laboratory should have ISO accreditation or equivalent. Sampling procedure is important. Recognised standard in Australia is NATA
Salmonella	Not Detected in 250gm (Sampling: 250gm sample comprised of 10X25gm sub-samples per lot). (See sampling protocol below)	Laboratory should have ISO/NATA accreditation or equivalent. Sampling procedure is important. Both methods BAM Ch 5 - AOAC and ISO 6579 acceptable
Coliforms	Less than 200 cfu/g	Coli forms are bacteria from faces and urine. E. Coli 0157 (high risk for foodstuff) is only isolated on a Coli form plate count. This strain is not picked up with a standard E. Coli test.
Entrobacteria		Required by other tree nuts - not an issue in macadamias
Reject Defects (Insect damage, discoloration, shrivelled)	Max 1%	
Insect Infestation	None	
Colour	Uniform normal, natural cream colour	
Kernel Appearance	Free from surface oil	
Flavour & Odour	No off flavours or odours	
Kernel Dust	Max 0.2%	
Foreign Material	None	
Loose Shell	Max 1 piece larger than 2mm per 100kg for style 0 to 4 and max 2 pieces per 100kg of kernel for other styles	
Impacted NIS	Max 1 piece larger than 2mm in 100kg of kernel	



Packaging		
Bulk Packing	Should be vacuum packed AND nitrogen flushed so that residual oxygen is less than 2%	
Bulk Packaging material	Water Vapour less than 0.1cc/m ² at 25C 75% RH and 1 atmosphere Oxygen less than 0.1cc/m ² at 25C 75% RH and 1 atmosphere	
Retail Packaging	Nitrogen flushed and residual oxygen is less than 2%	

Sizing		
Style 0	Greater than 20mm with min 95% wholes	See defintion of whole kernel
Style 1	16mm & 21mm with min 90% wholes	
Style S1	13mm to 17mm 95% wholes	
Style 2	Greater than 13mm with min 50% wholes and large pieces ranging in size from 13mm upwards.	
Style 3	Greater than 13mm with min 15% wholes	
Style 4L	Greater than 13mm with min 90% halves	
Style 4S	9-15mm with min 50% halves	
Style 5	8-13mm large chips	
Style 6	5-9mm chips and pieces	
Style 7	3-6 mm chips	
Style 8 (Meal)	Less than 4mm	

Definition of a whole kernel: Whole kernels are kernels which are not split or seperated into halves, with not more than 25% of the kernel missing provided that the kernel contour is not materially affected by the missing portion.