

HOT WATER TREATMENT OF MANGOES

REVISION REGISTER

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1. PURPOSE

The purpose of this procedure is to describe-

- (a) the principles of operation, design features and standards required for hot water treatment equipment; and
- (b) the responsibilities and actions of personnel;

that apply to the certification of hot water treatment of mangoes for fruit fly for under an Interstate Certification Assurance (ICA) arrangement.

2. SCOPE

This procedure covers all certification of hot water treatment of mangoes for fruit fly by a Business operating under an Interstate Certification Assurance arrangement in Queensland.

This Operational Procedure covers hot water treatment of mangoes only.

Certification of hot water treatment of mangoes under this Operational Procedure may not be an accepted quarantine entry condition for all fruits to all intrastate or interstate markets.

Some intrastate or interstate markets may require additional quarantine certification for pests and diseases other than fruit fly as a condition of entry.

It is the responsibility of the business consigning the produce to ensure compliance with all applicable quarantine requirements.

Information on intrastate and interstate quarantine requirements can be obtained from the ICA Supervisor for your district.

3. **REFERENCES**

WI-02

Guidelines for Completion of Plant Health Assurance Certificates

4. **DEFINITIONS**

accredit means to accredit persons to issue Assurance Certificates under section 21 of the *Plant Protection Act 1989*.

Application for
Accreditationmeans an Application for Accreditation of a Business
for an Interstate Certification Assurance (ICA)
Arrangement [FDU 385].

Assurance Certificate means a Plant Health Assurance Certificate [FDU 384].



Authorised Signatory	means an officer of an ICA accredited Business whose
	name and signature is provided as an authorised
	signatory with the Business's Application for
	Accreditation.

- **Business** means the legal entity responsible for the operation of the facility and ICA arrangement detailed in the Business's Application for Accreditation.
- Certification voluntary arrangement between the means а Department of Primary Industries and a Business that Assurance demonstrates effective in-house quality management through and provides assurance documented procedures and records that produce meets specified requirements.
- certified/certification means covered by a valid *Plant Health Assurance Certificate* [FDU 384].
- facility means the location of the hot water treatment operation covered by the Interstate Certification Assurance arrangement.
- fruit fly means Queensland fruit fly.
- **HWT** means hot water treatment.
- ICA means Interstate Certification Assurance.
- Inspector means an inspector appointed under the Plant Protection Act 1989.
- Interstatemeans a system of Certification Assurance developedCertificationto meet the requirements of State and TerritoryAssurancegovernments for the certification of produce for
interstate and intrastate quarantine purposes.
- lot means the total number of fruit covered by one hot water treatment.
- mango means fruit of the species *Mangifera indica*.

Papaya Fruit Fly Pestmeans a quarantine area declared under Section 11 ofQuarantine Areathe Plant Protection Act 1989 for papaya fruit fly.

- Tasmania onlymeans the section applies to consignments being
consigned to Tasmania only.
- **Queensland fruit fly** means all stages of the species *Bactrocera tryoni* and related species *B. aquilonis* and *B. neohumeralis.*



5. **RESPONSIBILITY**

These position titles have been used to reflect the responsibilities of staff under the ICA arrangement. These positions may not be present in all Businesses, or different titles may be used for staff who carry out these responsibilities. In some Businesses one person may carry out the responsibilities of more than one position.

The Certification Controller is responsible for -

- representing the Business during audits and other matters relevant to ICA accreditation;
- ensuring the Business has current accreditation for an ICA arrangement under this Operational Procedure;
- training staff in their duties and responsibilities under this Operational Procedure;
- ensuring the Business and its staff comply with their responsibilities under this Operational Procedure;
- ensuring that all hot water treatment of mangoes certified under the Business's ICA arrangement is carried out in accordance with this Operational Procedure.

The Treatment Operator is responsible for -

- calibrating temperature sensors (refer 7.2.1);
- maintaining Reference Thermometer Certificates of Testing from a recognised Testing Authority (refer <u>7.2.1</u>);
- maintaining records of temperature sensor calibration testing (refer 7.2.2);
- placing temperature sensors in fruit and the hot water bath prior to commencing hot water treatment (refer <u>7.3.1</u>);
- ensuring fruit is completely immersed for the required minimum treatment period once the treatment temperature has been attained (refer <u>7.3.2</u>);
- maintaining hot water treatment records (refer <u>7.3.3</u>).

The Authorised Dispatcher is responsible for -

- ensuring all packages containing fruit covered by an Assurance Certificate issued by the Business are identified (refer <u>7.6.1</u>);
- maintaining copies of all Assurance Certificates issued by the Business under the ICA arrangement (refer <u>7.7</u>).

Authorised Signatories are responsible for -

 ensuring, prior to signing and issuing an Assurance Certificate, that produce covered by the certificate has been prepared in accordance with the Business's ICA arrangement and that the details on the certificate are true and correct in every particular (refer <u>7.6.2</u>).



6. **REQUIREMENT**

Mango fruit treated in an approved hot water treatment facility so that the temperature of the flesh adjacent to the seed is at 46° C for a minimum period of 10 minutes.

The Department of Primary Industries and interstate quarantine authorities maintain the right to inspect at any time certified produce and to refuse to accept a certificate where produce is found not to conform to specified requirements.

Mangoes may be damaged by hot water treatment. Businesses applying hot water treatment should check with experienced persons such as departmental officers for any available information. Testing of small quantities is recommended.

7. PROCEDURE

7.1 Accreditation

7.1.1 Application for Accreditation

A Business seeking accreditation for an ICA arrangement under this Operational Procedure shall make application for accreditation (refer <u>Attachment 1</u>) at least 10 working days prior to the intended date of commencement of certification of produce.

7.1.2 Audit Process

Initial Audit

Prior to accrediting a Business, an Inspector carries out an initial audit of the Business to verify the ICA system is implemented and capable of operating in accordance with the requirements of the Operational Procedure, and the system is effective in ensuring compliance with the specified requirements of the ICA arrangement.

On completion of a successful initial audit, applicants will be granted provisional accreditation and provided a Certificate of Accreditation (refer <u>7.1.3 Certificate of Accreditation</u>).

Compliance Audits

Compliance audits are conducted to verify that the ICA system continues to operate in accordance with the requirements of the Operational Procedure.

A compliance audit is conducted within four weeks of the initial audit and accreditation of the Business.



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On completion of a successful compliance audit, annual accreditation is granted to cover the current season, up to a maximum of twelve months from the date of provisional accreditation, and a new Certificate of Accreditation issued (refer <u>7.1.3 Certificate of Accreditation</u>).

Ongoing compliance audits are conducted at least once every six months for a Business that operates for more than six months of each year.

Random audits are conducted on a selected number of accredited Businesses each year. Random audits may take the form of a full compliance audit, or audits of limited scope to sample treatment mixtures, certified produce, ICA system records or ICA system documentation.

Unscheduled compliance audits may be conducted at any time to investigate reported or suspected nonconformances.

Re-Accreditation

Accredited Businesses are required to re-apply for accreditation each year the business seeks to operate under the ICA arrangement. Businesses seeking re-accreditation must lodge a renewal application prior to accreditation lapsing, or if accreditation has lapsed, prior to commencing further certification of produce under the ICA arrangement.

A compliance audit is conducted within four weeks of the Business applying for re-accreditation each year.

7.1.3 Certificate of Accreditation

An accredited Business will receive a *Certificate of Accreditation for an Interstate Certification Assurance Arrangement* detailing the facility location, Operational Procedure, scope (type of produce) and period of accreditation.

The Business must maintain a current Certificate of Accreditation and make this available on request by an Inspector.

A Business may not commence or continue certification of produce under the ICA arrangement unless it is in possession of a valid and current Certificate of Accreditation for the procedure and produce type covered by the Assurance Certificate.

7.2 Hot Water Treatment Equipment Requirements

Hot water treatment facilities will require three (3) temperature sensors to record fruit and one (1) temperature sensor to record water bath temperatures and a recording system to capture temperature readings.

Temperature sensors must be capable of reading in increments of 0.5° C or less.



7.2.1 Calibration of Temperature Sensors

The calibration of temperature sensors will be done prior to the commencement of the season and at monthly intervals thereafter throughout the period of operation. Calibration will be performed using the hot water treatment bath stabilised at 46 $^{\circ}$ C.

Temperature sensors shall be placed in the water bath and sufficient time (approximately 1 hour) allowed for the temperature in the water bath to stabilise. The primary standard used for determining the temperature of the water bath at the time of calibration will be a reference thermometer.

Reference thermometers used for calibrating temperature sensors shall be uniquely identified and shall be calibrated and certified by a recognised Testing Authority as accurate to within $\pm 0.1^{\circ}$ C at 46° C. Calibration by a recognised Testing Authority shall be performed annually immediately prior to the commencement of the season.

The business shall maintain records of Reference Thermometer calibration as provided by the Testing Authority. Certificates of calibration must be traceable to the specified Reference Thermometer.

The reading of each sensor shall be within ± 0.4 °C of 46° C for 3 readings taken at five-minute intervals, recorded and compared to the certified Reference Thermometer. Variations will be recorded for each sensor.

Equipment that reads in increments of only 0.50 C must give a reading of 46° C on each of the three readings.

If the temperature recording equipment provides a zeroing function, the reading of each sensor may be adjusted to the same temperature as the certified reference thermometer.

Temperature sensors that fail calibration or are otherwise deemed as unusable shall be disposed of or identified in such a manner as to prevent inadvertent use.

7.2.2 Temperature Sensor Calibration Records

The business shall maintain results of calibration checks on temperature sensors. Temperature sensor calibration test records shall record the following information-

- the date of calibration;
- the identification of the Reference Thermometer used to calibrate the temperature sensors;
- the identification of the temperature sensors calibrated;
- confirmation that each temperature sensor is accurate to within $\pm~0.4^{o}C$ at $46^{o}\,C;$
- the officer responsible for conducting the calibration check.



An example Temperature Sensor Calibration Test Record is included as <u>Attachment 4</u>.

7.3 Hot Water Treatment

The Treatment Operator shall undertake hot water treatment of all mangoes certified under this Operational Procedure in accordance with <u>6. Requirement</u>.

The Treatment Operator shall ensure that all fruit are placed into appropriate treatment containers.

Treatment containers must be made from a material that allows adequate water circulation through and around the fruit. For example, plastic crates, wooden slatted or open metal bulk bins may be used.

7.3.1 Placement of Temperature Sensors

The Treatment Operator shall insert one temperature sensor in the flesh of each of three large fruit located at the top, middle and bottom of the treatment container to determine flesh temperatures of treated fruit. The largest fruits within the treatment lot shall be selected for the placement of the sensors within the fruit.

Sensors shall be inserted into the flesh of the fruit along the stem end and inserted until they reach the seed. Sensors should then be withdrawn slightly to ensure that the probe is to the full depth of the flesh but at no point in contact with the seed.

A fourth sensor shall be fully immersed in the water bath to determine the water bath temperature.

Temperature sensors shall be uniquely identified to enable the Treatment Operator to correlate temperature readings with specific sensors.

7.3.2 Fruit Immersion and Treatment

The treatment container(s) shall be placed into the water bath. The Treatment Operator must ensure all fruit are fully immersed and fruit does not float from the treatment container.

A mesh lid or other device may be required to ensure all fruit remains fully immersed during hot water treatment.

After the treatment container(s) have been secured in the water bath, the water bath shall be heated to at least 46° C (refer <u>6. Requirement</u>). The three fruit temperature sensors must record 46° C or above before treatment can commence. Treatment time shall not commence until **all** temperature sensors have reached the required treatment temperature of 46° C.



The Treatment Operator shall monitor the water bath throughout the treatment. HWT facilities that require manual reading and recording of data shall have readings taking at each of the four sensors at five minute intervals until completion of the treatment time.

Temperatures at each of the sensors must remain at or above 46° C for at least 10 sequential minutes. That is, temperature readings at each of the four sensors must read 46° C or greater for three sequential readings. The treatment time shall recommence on any occasion that the temperature at any sensor falls below the required minimum temperature of 46° C.

An accurate timing mechanism capable of measuring time to the second shall be used for timing the duration of fruit treatment.

The Treatment Operator shall maintain records of hot water treatment and temperature sensor readings (refer <u>7.3.3 Hot Water Treatment Records</u>).

7.3.3 Hot Water Treatment Records

The Certification Controller must record each hot water treatment using a Hot Water Treatment Record (refer <u>Attachment 3</u>) or records which capture the same information.

The Business's hot water treatment records must record -

- the date of hot water treatment;
- the treatment temperature (°C);
- the treatment commencement time;
- the temperature measured at each sensor at a minimum of five minute intervals during the treatment period, including at commencement and completion of the treatment time;
- the treatment completion time;
- the approximate quantity of fruit treated;
- the identification of the Treatment Operator.

7.4 Grading and Packing

A Business which grades and packs both treated (ie. meets the requirements listed in 6. Requirement) and untreated fruit shall implement systems to identify the treatment status of fruit to prevent mixing of conforming and nonconforming fruit.

7.4.1 Identification of Treated and Untreated Fruit During Grading and Packing

Examples of acceptable methods of identifying treated and untreated fruit during grading and packing include -

- (a) packing treated fruit at different times to untreated fruit and clearing the lines before changing over; or
- (b) packing treated and untreated produce on different packing lines.



Other methods may be used provided they clearly identify and segregate treated and untreated fruit and are acceptable to the auditor.

7.4.2 Identification of Treated and Untreated Fruit After Packing

Examples of acceptable methods of identifying the treatment status of conforming and nonconforming fruit after packing include -

- (a) using packaging that differs significantly in appearance; or
- (b) immediately marking each package of treated fruit in a manner that clearly identifies the fruit as conforming to the requirements specified under this Operational Procedure (refer <u>7.6.1 Package Identification</u>).

7.5 Post Treatment Security

All facilities -

Any fruit which is stored outside the treatment facility after treatment and prior to dispatch must be held under secure conditions.

Any treated fruit which remains unpacked at the end of the day must be held in secure conditions until packed.

For Tasmania only -

Packing shall commence as soon as practicable after treatment. Fruit may be allowed to dry adequately prior to packing.

Treated fruit shall be held for the minimum practical period after treatment before it must be secured against reinfestation.

Completed pallets shall be held for the minimum practical period before placing in secure conditions.

Certified fruit must be transported from the facility in secure conditions which prevent infestation by fruit fly.

Secure conditions include-

- (a) unvented packages;
- (b) vented packages with the vents secured with gauze/mesh with a maximum aperture of 1.6 mm;
- (c) fully enclosed under tarpaulins, hessian, shade cloth, mesh or other covering which provides a maximum aperture of 1.6 mm;
- (d) shrinkwrapped and sealed as a palletised unit;
- (e) fully enclosed or screened buildings, coldrooms, vehicles or other facilities free from gaps or other entry points greater than 1.6 mm.

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

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Fruit consigned to Tasmania must be transported in full container lots sealed prior to transport, or as lesser container lots in accordance with the requirements of (a), (b) or (d) above.

Where consignments are transported to Tasmania as full container lots, the seal number must be included in the Brand Name or Identifying Marks section of the Assurance Certificate covering the consignment (refer <u>Attachment 2</u>).

Where consignments are transported in vented packages that are sealed as a palletised unit in accordance with (d) above, the Business must secure the top layer of the pallet by applying a continuous band of tape over the shrinkwrap and have applied to the tape in waterproof ink the signature of an Authorised Signatory, the number of the Plant Health Assurance Certificate covering the consignment and the date.

7.6 Dispatch

7.6.1 Package Identification

The Authorised Dispatcher shall ensure that, after treating and packing, each package is marked in indelible and legible characters of at least 5mm, with -

- the Interstate Produce number of the Business that operates the approved facility in which the produce was treated; and
- the words "MEETS ICA-10"; and
- the date (or date code) on which the fruit was treated;

prior to the issuance of an Assurance Certificate by the Business under this Operational Procedure.

Any packages containing fruit that has not been hot water treated in accordance with the requirements of this Operational Procedure shall not be marked as stated above.

7.6.2 Assurance Certificates

The Authorised Dispatcher shall ensure an Assurance Certificate is completed and signed by an Authorised Signatory of the Business prior to dispatch of the consignment from the facility to a market requiring certification of hot water treatment for fruit fly.

Assurance Certificates shall be in the form of a *Plant Health Assurance Certificate* [FDU 384]. A completed example is shown as <u>Attachment 2</u>.

Individual Assurance Certificates shall be issued to cover each consignment (ie. a discrete quantity of product transported to a single consignee at one time) to avoid splitting of consignments.



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Assurance Certificates shall be completed, issued and distributed in accordance with the Work Instruction *Guidelines for Completion of Plant Health Assurance Certificates* [WI-02].

7.6.3 Assurance Certificate Distribution

The original (yellow copy) must accompany the consignment.

The **duplicate** (white copy) must be retained by the Business.

7.7 ICA System Records

The Business shall maintain the following records-

- (a) Reference Thermometer Test Certificates (refer <u>7.2.1</u>);
- (b) Temperature Sensor Calibration Test Record (refer 7.2.2);
- (c) Hot Water Treatment Record (refer 7.3.3);
- (d) a copy of each *Plant Health Assurance Certificate* [FDU 384] issued by the Business (refer <u>7.6.3</u>);

ICA system records shall be retained for a period of at least 12 months from completion, or until the next compliance audit of the ICA arrangement, whichever is the later.

An accredited Business must hold a minimum of 12 months ICA system records at the time of any compliance audit. If the compliance audit is conducted more than 12 months from the last compliance audit, the business must maintain all records completed since the previous compliance audit.

ICA system records shall be made available on request by an Inspector.

7.8 ICA System Documentation

The Business shall maintain the following documentation-

- (a) a copy of the Business's current Application for Accreditation (refer <u>Attachment 1</u>);
- (b) a current copy of this Operational Procedure;
- (c) a current Certificate of Accreditation for an Interstate Certification Assurance (ICA) Arrangement.

ICA system documentation shall be made available on request by an Inspector.



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8. ATTACHMENTS

Attachment 1	ent 1 Application for Accreditation of a Business for an Interstate Certification Assurance (ICA) Arrangement					PAGE
Attachment 2	Plant Health A	ssurance	Certificate		FDU 384 (COMPLI EXAMPL	
Attachment 3	Hot Water Tre	atment Re	ecord		(BLANK)	
Attachment 4	Temperature Record	Sensor	Calibration	Test	(BLANK)	

QUEENSLAND DEPARTMENT OF				f a Business for an (ICA) Arrangement
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(c) Trading	Name/s of the business (as shown	D	ARBN	
(d) Postal	address of the business		Telephone Facsimile Mobile	
(e) Has the for the	business been registered previously interstate movement of produce?		If yes, give the	he business's uce (IP) Number
2. Operat (a) Operat Referen	tional Procedure and Facilia ional Procedure used in this ICA a $\frac{Ce}{\Delta}$ If the Operating two parts	ty Details	cumented	Procedures) Part A 🔄 Part B 🔄 Parts A & B
	address of the facility Postco		Telephone Facsimile Mobile	()
5. Autno.	rised Signatories (for Assurat	-		
Certification Controller Back-Up Certification Controller Additional Authorised Signatories	Family Name	Given Nan	ne/s	Specimen Signature

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Declaration	of the approdited k	uning on that proposed i	in a second second second	an departie of about	e hereby declare that the			

I, an Authorised Signatory of the accredited business that prepared the plants or plant produce described above, hereby declare that the plants or plant produce have been prepared in the business's approved facilities in accordance with the business's Certification Assurance arrangement under the Plant Protection Act 1989 and that the details shown above are true and correct in every particular. Signature Date

Authorised Signatory's Name (Please print)

Arthur John Signatory

Signatory

9/12/98

Form FDU 384 6/96

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Forms Management Unit

ATTACHMENT 2

HOT WATER TREATMENT RECORD

Date of	Treatment	Start	Sensor	Sensor Reading (°C) @ Minute		Finish	Quantity Of Fruit	Treatment	Operator	
Treatment	Temp. (°C)	Time	ID	0	5	10	Time	Treated (kg)	Printed Name	Signature

TEMPERATURE SENSOR CALIBRATION TEST RECORD

Date of	Reference	Temperature Sensor		Sensor Reading @ 46 °C		Within ±0.4 °C	Officer's	Officer's
Calibration	Thermometer Used	Identification	1	2	3	(Yes or No)	Printed Name	Signature