GOOD AGRICULTURAL PRACTICES FOR
CUT FLOWER ORCHID

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives

UNOFFICIAL TRANSLATION

THAI AGRICULTURAL STANDARD
TAS 5501-2009

GOOD AGRICULTURAL PRACTICES FOR
CUT FLOWER ORCHID

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Since the Good Agricultural Practices For Orchid (TAS 5500–2004) has been established and notified by the Ministry of Agriculture and Cooperatives on 26 April B.E. 2547 (2004) under the Royal Gazette, general issue volume, dated 7 June B.E. 2547 (2004), circumstances have been changed over times in particular developments on orchid production and market trends. The Agricultural Standards Committee deems necessary to revise this particular standards so as to meet current situation in which will be more practical for producers as well as acceptable to both domestic and international consumers.

This establishment of this standard is based on the information of the following documents:


NOTIFICATION OF THE MINISTRY OF AGRICULTURE AND COOPERATIVES
SUBJECT: THAI AGRICULTURAL STANDARD:
GOOD AGRICULTURAL PRACTICES FOR CUT FLOWER ORCHID
B.E. 2552 (2009)

Whereas the Agricultural Standards Committee deems necessary to establish an agricultural standard on Good Agricultural Practices for Cut Flower Orchid in accordance with the Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet its quality standard and safety.

By virtue of Section 5, Section 15 and Section 16 of the Agricultural Standards Act B.E. 2551 (2008), the Minister of Agriculture and Cooperatives hereby issues this Notification on Establishment of Thai Agricultural Standard: Good Agricultural Practices for Cut Flower Orchid as follows:

1. The Notification of the National Committee on Agricultural Commodity and Food Standards entitled the establishment of Thai Agricultural Commodity and Food Standard: Good Agricultural Practices for Cut Flower Orchid dated 7 June is repealed.

2. Thai Agricultural Standard on Good Agricultural Practices for Cut Flower Orchid (TAS 5501–2009) is established as voluntary standard, details of which are attached herewith.

Notified on 1 October B.E. 2552 (2009)

(Mr. Theera Wongsamut)
Minister of Agriculture and Cooperatives
THAI AGRICULTURAL STANDARD
GOOD AGRICULTURAL PRATICE FOR
CUT FLOWER ORCHID

1  SCOPE

This Thai Agricultural Standard establishes the requirements for production practices of cut flower orchid prior to transferring to an orchid packing house.

2  DEFINITIONS

For the purpose of this standard:

2.1 Cut flower orchid means orchid plants of all genus in the family Orchidaceae for cutting flower for commercial purpose.

2.2 Orchid cut flower means fresh orchid cut flower with complete stem and flowers.

2.3 Visual Inspection means an inspection of any external physical appearances of an item, for example produce, product, or apparent environment conditions. This is basically examined by eyes. Any other sensory evaluation may be applied depending on quality factors in question, and additional tools may be applied such as magnifying lens as necessary. Subsequently, physical appearances and environmental conditions shall be assessed so as to see if the criteria are fully met. The processes and working procedures are also necessary to be inspected visually.

2.4 Pesticide means hazardous substance used in agriculture overseen by the Department of Agriculture according to the Notifications of the Ministry of Industry entitled the List of Hazardous Substances issued by virtue of the Hazardous Substances Act B.E. 2535 (2002) and its amendments.

2.5 Pest means living organisms such as plant pathogens, insects, animals and weed injurious and damaging to plant.
3 REQUIREMENTS AND INSPECTION METHODS

Provisions concerning requirements and inspection methods for Good Agricultural Practices for cut flower orchid are defined in Table 1.

Table 1 Requirements and Inspection methods

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>REQUIREMENTS</th>
<th>INSPECTION METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Orchid farm or farm condition</td>
<td>1.1 Assign separate operation areas e.g. greenhouse, equipment and tool storage, production input storage.</td>
<td>1.1 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>1.2 The area within the farm shall be clean, well ventilated and drained.</td>
<td>1.2 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>1.3 Good plant health management so as not to harbour pest.</td>
<td>1.3 Visual inspection</td>
</tr>
<tr>
<td>2. Greenhouse</td>
<td>2.1 Strong structure with height according to different orchid varieties and farm condition.</td>
<td>2.1 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>2.2 Sun shade provided according to different orchid varieties and farm condition.</td>
<td>2.2 Visual inspection</td>
</tr>
<tr>
<td>3. Pest control</td>
<td>3.1 Pest surveillance shall be in place starting from growing. If pest is found, it shall be eradicated.</td>
<td>3.1 Review record of pest control</td>
</tr>
<tr>
<td></td>
<td>3.2 If any pesticide is applied:</td>
<td></td>
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<tr>
<td></td>
<td>3.2.1 Pesticide shall be registered with the Department of Agriculture and shall not be prohibited pesticide.</td>
<td>3.2.1 Visual inspection of pesticide storage</td>
</tr>
<tr>
<td></td>
<td>3.2.2 Introduction on product’s label registered with the Department of Agriculture shall be strictly followed and/or referred to the recommendations of the Department of Agriculture.</td>
<td>3.2.2 Review record</td>
</tr>
<tr>
<td>ITEMS</td>
<td>REQUIREMENTS</td>
<td>INSPECTION METHODS</td>
</tr>
<tr>
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</tr>
<tr>
<td>3.2.3</td>
<td>There shall be proper and safe storage, application, disposal and care for contamination to public water resources.</td>
<td>3.2.3 Visual inspection of pesticide storage and review record</td>
</tr>
<tr>
<td></td>
<td>3.3 Equipment used for spraying shall be in good condition. Spraying method shall be safe.</td>
<td>3.3 Visual inspection</td>
</tr>
<tr>
<td>4. Pre-harvest production</td>
<td>4.1 Orchid varieties shall be purposely selected, healthy, uniform, free from pest, and produced from reliable source.</td>
<td>4.1 Review record or source of production seedlings</td>
</tr>
<tr>
<td></td>
<td>4.2 Selection of growing media and method are appropriate to orchid varieties and growing conditions.</td>
<td>4.2 Review record and/or visual inspection</td>
</tr>
<tr>
<td></td>
<td>4.3 Water used shall be suitable quality for growing.</td>
<td>4.3 Visual inspection or laboratory analysis</td>
</tr>
<tr>
<td></td>
<td>4.4 Apply appropriate fertilizer formula, concentration and frequency for growing orchids.</td>
<td>4.4 Review record or visual inspection</td>
</tr>
<tr>
<td></td>
<td>4.5 Equipment and tools used in pre-harvesting shall not affect on orchid and orchid cut flower quality.</td>
<td>4.5 Visual inspection</td>
</tr>
<tr>
<td>5. Harvesting and post-harvest practices</td>
<td>5.1 Equipment and materials used in harvesting and transferring must be clean and with quality which does not have impacts on orchid and orchid cut flower quality.</td>
<td>5.1 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>5.2 Worker harvesting orchid cut flower shall perform harvesting, holding, and transferring with care to orchid cut flower.</td>
<td>5.2 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>5.3 Holding area for orchid cut flowers in the greenhouse shall be provided clean containers which can prevent contamination from pest, soil and refuse as well as shall be with shading and heat prevention.</td>
<td>5.3 Visual inspection</td>
</tr>
<tr>
<td></td>
<td>5.4 Grading of orchid cut flowers according to sizes and quality classification and culling orchid cut flowers with pest or sign of pest.</td>
<td>5.4 Visual inspection</td>
</tr>
</tbody>
</table>
5.5 Holding area for orchid cut flower prior to transferring to packing house shall be provided with table or clean containers in order to prevent contamination from pest, soil and refuse as well as shall be with shading and heat prevention.

5.5 Visual inspection

6. Personal health and training of worker

6.1 Workers who expose to pesticides shall be provided with adequate personal protective equipment.

6.1 Visual inspection

6.2 Personal hygienic facilities shall be adequately provided.

6.2 Visual inspection

6.3 Appropriate and sufficient health care shall be provided for workers.

6.3 Visual inspection and Interview

6.4 Provision of knowledge or training on operating procedures, basic skill of pest detection, pesticide management on regular basis.

6.4.1 Visual inspection
6.4.2 Review record of data and assess knowledge and understanding of workers

7. Record keeping

7.1 Complete record keeping on:

7.1.1 Source of orchid varieties
  7.1.1 Review record

7.1.2 Application of pesticide
  7.1.2 Review record

7.1.3 Name of trading partner
  7.1.3 Review record

7.1.4 Number of orchid cut flowers harvested
  7.1.4 Review record

7.1.5 Date of harvesting
  7.1.5 Review record

7.2 Maintaining the record for at least one year
  7.2 Review record

4  RECOMMENDATIONS ON GOOD AGRICULTURAL PRACTICES FOR CUT FLOWER ORCHID

The recommendations on good agricultural practices for cut flower orchid are to advise farmer for cut flower orchid on practices in every stage of production process in greenhouse prior to transferring to packing house to achieve quality cut flower orchid. Details of the recommendations are explained in the Annex A.
ANNEX A

RECOMMENDATIONS ON GOOD AGRICULTURAL PRACTICES
FOR CUT FLOWER ORCHID
(Section 4)

A.1 Orchid farm or farm condition

A.1.1 Assign separate operation areas e.g. greenhouse, equipment and tool storage, production input storage for convenience of operation. There shall be equipment and tools used within the greenhouse e.g. orchid racks and hanging rails, separated by varieties.

A.1.2 Area within the farm shall be clean, well ventilated and drained.

A.1.3 Good plant health management so as not to harbour pest e.g. cleaning measures both inside and surrounding area of the greenhouse, disposal of damaged orchid due to pest destruction, weed, refuse, empty pesticide containers and other materials which may be the host of pest and carrier animals. Trash bins shall be clearly identified e.g. normal trash, toxic trash and trash from plant leftover and placed separated orderly or identify the dump location clearly.

A.2 Greenhouse

A.2.1 Greenhouse posts should be either concrete, wooden, or steel as appropriate to the area and virulence of the wind.

A.2.2 The surrounding area of the greenhouse should not have any large tree. The roof of the greenhouse is shaded by net (with the exception of Vanda greenhouse) stretched tightly into one piece. In case of medium or large greenhouse where air ventilation may be poor, the net shall have a space of approximately 15 cm or overlapping 50 cm every interval of 20 m – 25 m.

The relation of the orchid genus, greenhouse height and light intensity are provided in Table A.1
Table A.1 Relation of the orchid genus, greenhouse height and light intensity

(Section A.2.2)

<table>
<thead>
<tr>
<th>Genus</th>
<th>Greenhouse Height (meters)</th>
<th>Light intensity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dendrobium</td>
<td>2.5–3.5</td>
<td>50–60</td>
</tr>
<tr>
<td>Oncidium</td>
<td>2.5–3.5</td>
<td>60–70</td>
</tr>
<tr>
<td>Aranda and Moccar</td>
<td>3.0–4.0</td>
<td>40–50</td>
</tr>
<tr>
<td>Vanda, flat leaf</td>
<td>3.0–4.0</td>
<td>50–70</td>
</tr>
<tr>
<td>Vanda, groovy leaf</td>
<td>3.0–4.0</td>
<td>40–50</td>
</tr>
</tbody>
</table>

A.3 Pest control

A.3.1 Pest surveillance shall be in place starting from growing. If pest is found at the economic threshold level, the pest control measures are appropriately applied according to the official recommendation and record of such pest surveillance.

A.3.1.1 Study should be conducted on pest, seasonal outbreak, symptoms and appropriated control methods. The major pest e.g. black rot, flower rusty spot, leaf spot, thrips, common cutworm, orchid midge, snail, and weeds are provided in Table A.2.

Table A.2 The major pests, seasonal outbreak, symptoms and control methods.

(Section A.3.1)

<table>
<thead>
<tr>
<th>Major Pests</th>
<th>Seasonal Outbreak</th>
<th>Symptoms</th>
<th>Control Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black rot caused by fungus</td>
<td>Infection in raining season. The disease is easily spread due to spores carried by water during watering or raining.</td>
<td>Infected to all parts of orchid - root, becoming black wound, rotten, dried and sunk. - stem tip being rotten, blackened. - stem base, leaves becoming yellow and fallen out. - leaves developing clear spots, watery yellow and turning into black brown. - cut flower peduncle developing rotten black wound.</td>
<td>- Should not grow orchid too dense. - If disease is found, separate infected orchid and burnt. - Watering in the evening should be avoided, in particular during winter due to high humidity which will be suitable for infection. - Growing media shall be well drained and aerated.</td>
</tr>
<tr>
<td>Major Pests</td>
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<td>Symptoms</td>
<td>Control Methods</td>
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</tbody>
</table>
| Flower rusty spot caused by fungus | Rapid outbreak during long raining period or excessive dew. | - flowers developing black spots with the yellow ring causing budding flowers fallen.                                                                                                                                                                                                                                                                                                                                                                                   | - Burn fallen infected flower.  
- Apply high potassium fertilizer during flowering stage to enhance disease tolerance.  
- When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.                                                                                                                                                             |
| Black anther caused by fungus       | Rapid outbreak during long raining period. | Frequently found in Dendrobium, causing a significant problem for export due to the fact that symptoms will be visible during transportation. The yellow-brown spots will be developed on petal and enlarged into rusty like color of dark yellow.                                                                                                                                                                                                                                                                                                                                                       | - Avoid the flowers to bloom on stems.  
- Burn the diseased parts.  
- In the rainy season when the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.                                                                                                                                                                                                 |
| Yellow leaf spot caused by fungus   | Rapid outbreak during rainy to the winter seasons. | The symptoms start with round yellowish spots on the leaf and stem base. As the disease grows, the spots expand along the leaf length. Black power-like particles are found under the leaf eventually turns brown and fallen.                                                                                                                                                                                                                                                                                                                                                   | - Burn the diseased parts.  
- When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.                                                                                                                                                                                                 |

**Notes:**
- **Flower rusty spot:** Rapid outbreak during long raining period or excessive dew.  
Frequently found in Dendrobium, causing a significant problem for export due to the fact that symptoms will be visible during transportation. The yellow-brown spots will be developed on petal and enlarged into rusty like color of dark yellow.  
- **Black anther:** Rapid outbreak during long raining period.  
Frequently found in Dendrobium, causing a significant problem for export due to the fact that symptoms will be visible during transportation. The normal tissues become flat and the spots of grayish black wounds will be appeared at the stamen and pistil in the “column” of the flower, the wound rim may be in dark brown.  
- **Yellow leaf spot:** Rapid outbreak during rainy to the winter seasons.  
The symptoms start with round yellowish spots on the leaf and stem base. As the disease grows, the spots expand along the leaf length. Black power-like particles are found under the leaf eventually turns brown and fallen.
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| **Leaf spot caused by fungus**     | Outbreak throughout the year, but mostly found between the rainy to the winter seasons. | - In Vanda, the spots are of oval-shaped like shuttle. When spots combine, they create a plate with an elevated blackish brown spot.  
- In Dendrobium, the spot is dark or blackish brown round circled by a light brown ring. Sometimes the spot is shrunk or elevated and can appear on both top and bottom may start with a small yellow spot which eventually turns black. | - Burn the diseased parts.  
- When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture. |
| **Soft rot caused by bacteria**    | Rapid outbreak in rainy season         | At an early stage, a small watery spot appears on the leaf or young shoot. The spot grows and the plant tissue appears as contracted with hot water. Within two to three day, the leaf turns brown and becomes swollen, with the spot being surrounded by a clear yellow ring. The leaf tissues are translucent causing leaf veins become clearly visible. In severe case, the whole orchid stems become rotten and die. | - If the disease is observed, watering shall be hold off to allow the affected parts to dry out and limit the spread.  
- Burn the diseased parts.  
- When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture. |
| **Stem rot caused by bacteria**    | Rapid outbreak in rainy season         | The fungus starts to destroy the root part and then spreads to the stem and top. The parts destroyed turn into yellow and brown. | - Examine and selection of decease free breeding plant before taking for breeding  
- When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Viral diseases caused by two kinds of virus</td>
<td>The disease is outbreak through propagation methods like tissue culture and division.</td>
<td>Mostly found in almost all orchid species where propagation plants has been done continuously. The severity of disease symptoms has differentiated among varieties. The disease causes damages to the quality of stems and flowers such as leaf mosaic, shorten internodes, shorten flower stalks, poor growth, and decreased yield, etc.</td>
<td>- Ensure the use of disease-free parent plant for tissue culture or division, request for recommendations from the Department of Agriculture where possible. - Ensure the use of sterilized tools during propagation stage.</td>
</tr>
<tr>
<td>Thrips With very small size app. 0.8 mm – 1.0 mm clear yellow color, cycle life from egg to full growth 14 days.</td>
<td>Outbreak during summer and winter season or dry weather and long intervals of no rain period for a long time.</td>
<td>Thrip is the significant pest of orchid. They attack orchids by sucking out fluid from petals leaving scars all over the flowers.</td>
<td>- Install stick glue traps with ratio of 100 traps per rai for forecasting and reduce the adult insects. - If thrips are of excessive level, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td>Orchid midge Is a kind of flies. Fully grown flies lay eggs on flower stem. Fully grown worm is app. 2.0 mm</td>
<td>Rapid outbreak in rainy season.</td>
<td>The insects eat the inner parts of petals causing dwarf flower growth and fall easily.</td>
<td>- Burn the damaged flowers in order to get rid of larvae and the young insects. Avoid the flowers to become rotten and fall as the larvae will grow in the soil or planting materials. - When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td>Beet armyworm Is a nighttime butterfly. Worm period from 14 – 47 days. Fat trunk and smooth skin and of many colors.</td>
<td>Rapid outbreak in summer season.</td>
<td>Larvae eat orchid flowers, stems and leaves causing damages to the plants.</td>
<td>- Collection of egg group and worms for destruction. - When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td>Major Pests</td>
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<td>Symptoms</td>
<td>Control Methods</td>
</tr>
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</tr>
<tr>
<td><strong>Common cutworm</strong>&lt;br&gt;is nighttime butterfly with worm period of 14 – 21 days with fat smooth trunk with green and brown colors and black stripes</td>
<td>Rapid outbreak in rainy season.</td>
<td>Larvae eat orchid flowers, stems and leaves causing damages to the plants.</td>
<td>− Collection of egg group and worms for destruction.&lt;br&gt;− When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td><strong>Orchid flat mite</strong>&lt;br&gt;or phalaenopsis mite</td>
<td>Rapid Outbreak in all season.</td>
<td>Flower petal back become dark purple spots or swelling white and brown spots, and clustered mites grouping on leaf surface in small red spots of the size of needle point with white slough of mite like dust, on surface settling this turns to brown color.</td>
<td>− Avoid growing plant giving havens for this mite e.g. fern for example. If growth is necessary care for prevention and disposal of mites should be made&lt;br&gt;− When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td><strong>Dolichotetranychus vandergooti</strong>&lt;br&gt;(Oudemans)</td>
<td>Rapid outbreak in rainy season.</td>
<td>Leaf shell turns into brown or black. Upon removing leaf shell clusters of mites in orange or fresh red shall appear.</td>
<td>− Avoid growing plant giving havens for this mite e.g. fern for example. If growth is necessary care for prevention and disposal of mites should be made&lt;br&gt;− When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
<tr>
<td><strong>Succinea sp. snail</strong>&lt;br&gt;and number 1 shape snail.</td>
<td>Rapid outbreak in rainy season.</td>
<td>The snails eat plant buds and shoots, flower stalks. The pest leaves behind gluey marks along their paths which opens opportunity for pathogen contaminations.</td>
<td>− Roasting or drying growing material should be made.&lt;br&gt;− When the pathogen is found, pesticide shall be applied according to recommendation of the Department of Agriculture.</td>
</tr>
</tbody>
</table>
### Major Pests - Seasonal Outbreak - Symptoms - Control Methods

<table>
<thead>
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<th>Control Methods</th>
</tr>
</thead>
</table>
| Weeds. One-season weed breed on seeds and over-year weed breed with root. | Rapid outbreak in rainy season.                | Weeds can be hosts for other pests and harmful animals.        | - Dispose weeds surrounding the orchid greenhouse area, under the table and walking area before flowering  
|                                      |                                                |                                                               | - Dispose weeds while still young or not flowering.                              |

### A.3.2 If pesticide is applied:

A.3.2.1 Use legally registered pesticide adhered with registration number and instruction for orchid given on the product’s label. Banned pesticide from manufacturing, import, export or holding according to the Hazardous Substance Act B.E. 2535 and its amendments shall not be used. Read the instruction on the product’s label so as to understand the active ingredients and properties of pesticide and how to use it properly prior to application or referring to the recommendations of the Department of Agriculture.

A.3.2.2 Application of pesticide shall be coincided with the pest found and in accordance with the instruction on product’s label and/or refer to the recommendations of the Department of Agriculture and record such application.

A.3.2.3 Each pesticide shall be contained in tightly sealed container, with clear sign/and categorised and kept separately from, fertilizers, plant growth regulators and plant nutrient supplements. The pesticide containers that have been opened are not allowed to transfer content from their original container. Empty pesticide container shall be punctured and/or crushed to prevent reuse and discarded at allocated area or by burying at sufficient depth to avoid interference by animal digging and kept distances from water sources. The burning of empty containers is prohibited. Beware of contamination to public water sources.

A.3.3 Workers responsible for pesticide application should know pest, type of pesticide and its dosage, and type of sprayer and nozzle as well as precise method of spraying. The workers shall regularly check sprayer and equipment to be ready for use. In order to protect themselves from pesticide exposure, the worker should wear proper clothing and appropriate use of personal protective equipment such as masks, gloves, and hats/caps, and boots so as to prevent exposure to pesticides.
A.4 Pre-harvest production.

A.4.1 Orchid planting materials shall be selected from reliable source. The planting materials shall meet the characteristics of the required varieties, complete, healthy, and free from diseases and insects. Record sources of planting materials. The orchid propagation method shall be applied appropriately to each type of orchid i.e. tissue culture, division, cutting, shoot separation, top cutting, and branch shoot separation.

A.4.2 Use clean growing media and suitable with varieties of orchids taking into consideration of growing media properties such as aerated and well drained, supporting roots and vegetation growing, durable, not quickly decomposed, free from toxins, readily available and conveniently used.

A.4.3 Water used in the production process should be obtained from source which is not exposed to any risk of contamination, not to use wastewater from industrial factories or from other activities causing contamination of hazardous materials. In case where there is need to use such water, supporting evidences or proof showing that such water has been treated and able to be used for production are required.

A.4.3.1 Use water that has quality suitable for growing orchids e.g. with pH 5.2 to 8.5, Electroconductivity of less than 750 micromoh / cm.

A.4.3.2 Water should be sampled at least once at the beginning of production and sent to the official laboratory or certified laboratory for analysis and the results are kept as evidence.

A.4.4 Fertilizer should be applied thoroughly taking into consideration of growing media to stem, root and leaf with exception of flower. If it is too dry, water should be given 2 to 3 hours prior to fertilizing. Fertilizer should be applied on a sunny day and refrained from applying nitrogen fertilizer 2 to 3 days prior to cutting. The formula and rate of applying fertilizer should be as follows:

A.4.4.1 Nursing stage

Dendrobium, Moccara, Aranda and Vanda: grooved leaf shall be applied with folia fertilizer with 21–21–21 alternately with 30–10–10 at the rate of 250 grams to 400 grams to 200 liters of water per rai every seven days.
A.4.4.2 Vegetative stage.

Oncidium shall be applied with folia fertilizer with 21-21-21 at the rate of 150 grams to 200 grams to 200 liters of water per Rai every seven days. Dendrobium shall be applied with folia fertilizer with 21-21-21 alternate with 30-20-10 at the rate of 400 grams to 600 grams to water of 200 liters per Rai every seven days. Moccara, Aranda, and Vanda: grooved leaf uses ratio of 300 grams to 500 grams to water of 200 liters per Rai every seven days. Oncidium uses leaf fertilizer of 21-21-21 formula alternate with 16-21-27 formula or 7-24-34 formula with ratio of 250 grams to 400 grams per water of 200 liters per Rai every seven days.

A.4.4.3 Flowering stage

(1) Dendrobium uses leaf formula fertilizer of 21-21-21 alternate with 16-21-27 formula or 15-30-15 formula with ratio of 600 to 800 grams to 200 liters of water per Raid every seven days, and Moccara, Aranda and Vanda: grooved leaf uses ratio of 500 to 700 grams to 200 liters of water per Rai every seven days and to help reducing falling of budding flower in orchid of Dendrobium during change of season fertilizer of formula 16-21-27 should be given at ratio of 800 to 1,000 grams to 200 liters of water per Rai for number of once to twice.

(2) Oncidium uses leaf formula fertilizer of 21-21-21 alternate with formula 16-21-27 with ratio of 400 to 600 grams to 200 liters of water per Rai or formula 7-24-34 with ratio of 300 to 500 gram to 200 liters of water per Rai every seven day.

A.4.4.4 Harvesting stage

(1) Dendrobium uses leaf formula fertilizer of 15-30-15 alternate with 16-21-27 formula with ratio of 500 to 700 grams to 200 liters of water per Raid every seven days, and Moccara, Aranda and Vanda: grooved leaf uses ratio of 400 to 600 grams to 200 liters of water per Rai every seven days.

(2) Oncidium uses leaf formula fertilizer of 16-21-27 alternate with formula 7-24-34 with ratio of 300 to 500 grams to 200 liters of water per Rai every seven days.

A.4.5 Tools and equipment being used prior to harvesting are sufficiently available and suitable for the operation and stored separately, securely and easily accessible. The list of tools and equipment should be provided and kept including available maintenance plan and record.

The working condition of tools and equipment e.g. chemical spraying units, harvesting gears, agricultural tools should be regularly checked before use. Equipment requiring precision in the operation e.g. agricultural pesticide spraying nozzles shall be regularly calibrated. If any deviation is
found, the equipment shall be repaired or replaced so as to maintain its function of operation up to the required standard.

Provide cleaning before and after operations to the tools and equipment including containers for collecting and transferring cut flower orchid prior to keeping in storage.

A.5 Harvesting and post-harvest practices

A.5.1 Equipment and materials used for harvesting e.g. knives or scissors shall be sharp and clean. After each cutting, knives and scissors should be submerged in alcohol and flamed until alcohol is completely evaporated to prevent infection especially from virus that can affect the quality of orchid cut flowers.

A.5.2 Workers harvesting orchid cut flowers shall carefully perform their duties of harvesting, holding and transferring.

A.5.3 Holding and collecting points of orchid cut flowers in the greenhouse shall have clean containers to prevent contaminations from pest, microorganism, refuse, soil and dirt or other harmful materials. Also, they shall be in the area that can prevent the effect from heat and sunlight.

A.5.4 Remove defected orchid cut flowers with pest or sign of pest and dispose in the assigned area outside growing area. Primary grading of orchid cut flower shall be done.

A.5.5 Holding area for orchid cut flowers prior to transferring to packing house shall be provided with table or clean containers in order to prevent contaminations from pest, soil and refuse as well as shall be with shading and heat prevention.

A.6 Personal health and training of worker

A.6.1 Workers who expose to pesticides shall be provided with adequate personal protective equipment.

A.6.2 Personal hygiene facilities shall be appropriately provided for workers such as washing facilities, toilet, and apron. There should be a dining area separate from working space.

A.6.3 Appropriate and sufficient health care shall be provided for workers.
A.6.4 Provide knowledge or training on operating procedures, basic skill of pest detection, pesticide management, disinfectants or other substances on regular basis.

A.7 Record keeping

A.7.1 Required information shall be completely recorded i.e. sources of orchid planting materials, application of pesticide, names of trading partners, quantity of orchid cut flowers harvested and date of harvest.

A.7.2 Maintain work performance record and other important documents at least one year.
ANNEX B

UNIT

Unit and symbol used under this standard and International System of Units (SI) or *Le Système International d’Unités*) admissible herein are as following:

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit Name</th>
<th>Unit Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Millimeter</td>
<td>mm</td>
</tr>
<tr>
<td></td>
<td>Centimeter</td>
<td>cm</td>
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<tr>
<td></td>
<td>Meter</td>
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