Approved Drugs for Use in Aquaculture

Developed by:

U.S. Fish & Wildlife Service’s Aquatic Animal Drug Approval Partnership Program

American Fisheries Society’s Fish Culture and Fish Health Sections

Association of Fish & Wildlife Agencies - Fisheries and Water Resources Policy Committee’s Drug Approval Working Group
The legal and judicious use of U.S. Food and Drug Administration (FDA) approved aquaculture drugs can be challenging considering that a variety of approved products are available, each with specific permitted treatment regimens. This situation can, at times, be further complicated as new drugs are approved or new claims are added to existing approved drugs. To assist aquaculturists and other fisheries professionals, the U.S. Fish and Wildlife Service’s Aquatic Animal Drug Approval Partnership (AADAP) program, the American Fisheries Society’s Fish Culture and Fish Health Sections, and the Association of Fish and Wildlife Agencies - Fisheries and Water Resources Policy Committee’s Drug Approval Working Group have prepared this “Quick Desk Reference Guide to Approved Drugs for Use in Aquaculture.”

This desk reference guide complements a previously released poster version. Like the poster, the desk reference guide provides up-to-date information about all FDA-approved aquaculture drugs, including trade names, approved uses, allowable treatment regimens, and supplier contact information. Its format is suitable for use in hatchery and laboratory settings, as well as in the office, classroom, or in the field. Like the poster, the desk reference guide will be periodically updated as new and/or expanded uses of aquaculture drugs are approved by FDA.

In this desk reference guide, example treatment scenarios and suggested treatment calculations are provided for each drug. The suggested treatment calculations are provided simply as examples for your consideration, as we recognize there is typically more than one way to calculate the correct amount of an aquaculture drug needed for a given treatment scenario. As always, please refer to the product label when using any drug or chemical. If a drug or chemical is being used for the first time, you should consider testing the treatment on a small sample of the population. If you still have questions after reading the product label, please contact the manufacturer.

Request additional Quick Desk Reference Guides at: http://www.fws.gov/fisheries/aadap/home.htm
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# Chorionic Gonadotropin

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<tr>
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<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHORULON®</strong>&lt;br&gt;Merck Animal Health&lt;br&gt;1-800-521-5767</td>
<td>Male and female brood finfish</td>
<td>Aid in improving spawning function</td>
<td>• Males: 50 - 510 IU(^1) chorionic gonadotropin/lb&lt;br&gt;• Females: 67 - 1,816 IU chorionic gonadotropin/lb</td>
<td>• Intramuscular injection&lt;br&gt;• When reconstituted with the accompanying sterile diluent, each 10 mL vial contains 10,000 IU chorionic gonadotropin (i.e., 1,000 IU/mL)&lt;br&gt;• Inject up to three doses, the total dosage not to exceed 25,000 IU in fish intended for human consumption&lt;br&gt;• Depending on body weight and dose administered, it may be necessary to divide the dose between two or more injection sites to avoid injecting a large volume at a single site&lt;br&gt;• Prescription product restricted to use by or on the order of a licensed veterinarian&lt;br&gt;• 0-day withdrawal time</td>
</tr>
</tbody>
</table>

\(^1\) IU = International Units
**Example Treatment Scenario and Suggested Chorulon® Treatment Calculations**

**Injection Treatment**

**Example:** Your resource management objectives include the production of hybrid striped bass fingerlings for stock enhancement, and require the use of Chorulon® to induce ovulation in female striped bass. Previous experience with striped bass suggests that only one injection will be needed, and that female striped bass require a dose of 250 International Units (IU) chorionic gonadotropin/lb. Your first female weighs 20 lb. How many IU of chorionic gonadotropin should you inject? How much Chorulon® (mL) should you inject?

**Additional information:** 1 mL of reconstituted Chorulon® contains 1,000 IU of chorionic gonadotropin

**Calculations:**

- **IU to inject** = \[weight of fish (lb) \times dose (IU/lb)\]
  = \[20 \times 250\]
  = 5,000 IU

- **Chorulon® (mL) to inject** = \[\text{IU required/fish} \div 1,000 \text{ IU/mL}\]
  = \[5,000 \div 1,000\]
  = 5 mL of reconstituted Chorulon®

*Always refer to and follow all label instructions*
## Formalin - External Parasites

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
</table>
| PARASITE-S Western Chemical, Inc. 1-800-283-5292 | Control of external protozoa (species of the genera *Chilodonella, Costia, Epistyli, Scyphidia, Ichthyophthirius,* and *Trichodina*), and monogenetic trematodes (species of the genera *Cleidodiscus, Dactylogyrus,* and *Gyrodactylus*) | - Salmonids (salmon & trout) in tanks and raceways:  
  Above 50°F: up to 170 µL/L for up to 1 hr  
  Below 50°F: up to 250 µL/L for up to 1 hr  
  All other finfish up to 250 µL/L for up to 1 hr  
  Earthen ponds: 15 - 25 µL/L indefinitely | - Do not subject to temperatures below 40°F (4.4°C)  
- Do not apply when 1) water is warmer than 80°F (27°C), 2) there is a heavy phytoplankton bloom, or 3) dissolved oxygen is less than 5 mg/L  
- Ponds may be retreated in 5 to 10 days if needed  
- Do not treat ponds containing striped bass  
- Test on a small number of fish from each lot to check for any unusual sensitivity to formalin before proceeding  
- 0-day withdrawal time |
| FORMALIN-F Natchez Animal Supply Co. 1-800-647-6760 | All finfish | | |
| FORMACIDE-B B.L. Mitchell, Inc. 1-800-817-5808 | | | |
## Formalin - External Parasites (Shrimp)

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARASITE-S</strong>&lt;br&gt;Western Chemical, Inc.&lt;br&gt;1-800-283-5292</td>
<td>Penaeid shrimp</td>
<td>Control protozoan parasites (species of the genera <em>Bodo</em>, <em>Epistylis</em>, and <em>Zoothamnium</em>)</td>
<td>- Tanks and raceways: 50 - 100 µL/L for up to 4 hrs daily&lt;br&gt;- Earthen ponds: 25 µL/L as single treatment</td>
<td>• Do not subject to temperatures below 40°F (4.4C)&lt;br&gt;• Do not apply when 1) water is warmer than 80°F (27°C), 2) there is a heavy phytoplankton bloom, or 3) dissolved oxygen is less than 5 mg/L&lt;br&gt;• Ponds may be retreated in 5 to 10 days if needed&lt;br&gt;• Test on a small number of shrimp from each lot to check for any unusual sensitivity to formalin before proceeding&lt;br&gt;• 0-day withdrawal time</td>
</tr>
<tr>
<td><strong>FORMALIN-F</strong>&lt;br&gt;Natchez Animal Supply Co.&lt;br&gt;1-800-647-6760</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>FORMACIDE-B</strong>&lt;br&gt;B.L. Mitchell, Inc.&lt;br&gt;1-800-817-5808</td>
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</tr>
</tbody>
</table>
# FORMALIN - FUNGUS

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARASITE-S</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Western Chemical, Inc.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1-800-283-5292</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORMALIN-F</td>
<td>All finfish eggs</td>
<td>Control fungi of the family</td>
<td>• All finfish eggs: 1,000 - 2,000 µL/L for 15 min</td>
<td>• Do not subject to temperatures below 40°F (4.4C)</td>
</tr>
<tr>
<td>Natchez Animal Supply Co.</td>
<td></td>
<td>Saprolegniaceae</td>
<td>• Species of the order Acipenseriformes: up to 1,500 µL/L for 15 min</td>
<td>• Preliminary testing on a small number of eggs is recommended before treating an entire lot</td>
</tr>
<tr>
<td>1-800-647-6760</td>
<td></td>
<td></td>
<td></td>
<td>• 0-day withdrawal time</td>
</tr>
<tr>
<td>FORMACIDE-B</td>
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<tr>
<td>B.L. Mitchell, Inc.</td>
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<tr>
<td>1-800-817-5808</td>
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</tr>
</tbody>
</table>

Formalin
**Example Treatment Scenario and Suggested FORMALIN Treatment Calculations**

**Static Bath Treatment**

**Example:** You have a raceway containing a relatively low density of rainbow trout diagnosed with a Costia sp. infestation. The raceway measures 60 ft x 6 ft, with a water depth of 3 ft. Management has prescribed a treatment regimen of 170 µL/L formalin for 1 hour, and has determined that stocking density is low enough to allow for a static bath treatment. How much formalin (mL) must be added to the raceway to achieve the prescribed treatment concentration?

**Additional information:**
- Formalin is considered 100% active ingredient, for it is a saturated aqueous solution of formaldehyde gas.
- The specific gravity (SG) of formalin = 1.08
- Gallons per cubic foot = 7.48
- Conversion Factor (CF) to convert gallons to milliliters = 0.003785

**Calculations:**
- Volume of water (gal) in raceway = \[ \text{length (ft)} \times \text{width (ft)} \times \text{depth (ft)} \times 7.48 \text{gal/ft}^3 \]
  = 60 \times 6 \times 3 \times 7.48
  = 8,078 gallons

- Amount of formalin (mL) to add to raceway = \[ \text{water volume (gal)} \times \text{treatment concentration (µL/L)} \times \text{CF} + \text{SG} \]
  = 8,078 \times 170 \times 0.003785 + 1.08
  = 4,813 mL

*Always refer to and follow all label instructions*
**Example Treatment Scenario and Suggested Formalin Treatment Calculations**

**Charged Flow-through Treatment**

**Example:** You have a raceway containing a moderately high density of rainbow trout diagnosed with a *Costia* sp. infestation. The raceway measures 60 ft x 6 ft, with a water depth of 3 ft. Water flow into the raceway is 100 gpm. Management has prescribed a treatment regimen of 170 µL/L formalin for 1 hour, and has determined that stocking density is such that a charged flow-through treatment is recommended. How much formalin (mL) must be added to “charge” the raceway to the prescribed treatment concentration? How much formalin (mL) must be “metered” into the raceway inflow over the course of the 1 hour treatment duration to maintain the prescribed treatment concentration?

**Additional Information:**
- Formalin is considered 100% active ingredient, for it is a saturated aqueous solution of formaldehyde gas
- The specific gravity (SG) of formalin = 1.08
- Gallons per cubic foot = 7.48
- Conversion Factor (CF) to convert gallons to milliliters = 0.003785

**Calculations:**

Volume of water (gal) in raceway = \[ \text{length (ft)} \times \text{width (ft)} \times \text{depth (ft)} \times 7.48 \text{ gal/ft}^3 \]

= 60 \times 6 \times 3 \times 7.48

= 8,078 gallons

**Formalin (mL) to “charge” raceway**

= \[ \text{water volume (gal)} \times \text{treatment concentration (µL/L)} \times \text{CF} ÷ \text{SG} \]

= 8,078 \times 170 \times 0.003785 ÷ 1.08

= 4,813 mL

**Formalin (mL) “metered” into raceway**

= \[ \text{water flow (gpm)} \times \text{treatment duration (min)} \times \text{treatment concentration (µL/L)} \times \text{CF} ÷ \text{SG} \]

= 100 \times 60 \times 170 \times 0.003785 ÷ 1.08

= 3,575 mL

*Always refer to and follow all label instructions*
# Hydrogen Peroxide - External Bacteria

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater-reared salmonids</td>
<td>Control of mortality due to bacterial gill disease associated with <em>Flavobacterium branchiophilum</em></td>
<td>100 mg/L for 30 min or 50 - 100 mg/L for 60 min once daily on alternate days for 3 treatments</td>
<td>Preliminary testing on a small number of fish is recommended before treating an entire lot 0-day withdrawal time</td>
<td></td>
</tr>
<tr>
<td>35% PEROX-AID® Western Chemical, Inc. 1-800-283-5292</td>
<td>Freshwater-reared coolwater finfish and channel catfish</td>
<td>Control of mortality due to external columnaris disease associated with <em>F. columnare</em></td>
<td><strong>Fingerlings and adults:</strong> 50 - 75 mg/L for 60 min once daily on alternate days for 3 treatments  <strong>Fry:</strong> 50 mg/L for 60 min once daily on alternate days for 3 treatments</td>
<td>Preliminary testing on a small number of fish is recommended before treating an entire lot Should not be used to treat northern pike, paddlefish, or pallid sturgeon fry Use with caution on walleye 0-day withdrawal time</td>
</tr>
<tr>
<td>Product Name &amp; Supplier</td>
<td>Species</td>
<td>Indication</td>
<td>Dosing</td>
<td>Limitations &amp; Comments</td>
</tr>
<tr>
<td>-------------------------------</td>
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<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 35% PEROX-AID®, Western Chemical, Inc. 1-800-283-5292 | Freshwater-reared finfish eggs | Control of mortality due to saprolegniasis | • Coldwater and coolwater: 500 - 1,000 mg/L for 15 min in a continuous flow system once daily on consecutive or alternate days until hatch  
• Warmwater: 750 - 1,000 mg/L for 15 min in a continuous flow system once daily on consecutive or alternate days until hatch | • Preliminary testing on a small number of eggs is recommended before treating an entire lot  
• 0-day withdrawal time          |
Example Treatment Scenario and Suggested 35% PEROX-AID® Treatment Calculations*

Static Bath Treatment

Example: You have a 6 ft diameter circular tank (water depth of 3 ft) containing a relatively low density of yellow perch fingerlings that have been diagnosed with external columnaris. Management has prescribed a treatment regimen of 50 mg/L hydrogen peroxide for 1 hour, and has determined that stocking density is low enough to allow for a static bath treatment. How much hydrogen peroxide (mL) must be added to the tank to achieve the prescribed treatment concentration?

Additional information: The volume of a circular tank (cylinder) is determined by the equation: Volume = πr²h. \textbf{Note}: \(π = 3.14\); \(r\) = radius; and \(h\) = height (or depth)

35% PEROX-AID® contains 35% hydrogen peroxide as the active ingredient (%AI). \textbf{Note}: %AI expressed as 0.35 for calculation purposes

- Gallons per cubic foot = 7.48
- The specific gravity (SG) of 35% PEROX-AID® = 1.132
- Conversion Factor (CF) to convert gallons to milliliters = 0.003785

Calculations:

\[
\text{Volume of water (gal) in tank} = [3.14 \times \text{tank radius (ft)}^2 \times \text{water depth (ft)} \times 7.48 \text{ gal/ft}^3] \\
= 3.14 \times 3^2 \times 3 \times 7.48 \\
= 634 \text{ gallons}
\]

\[
35\% \text{ PEROX-AID® (mL) to add to tank} = \text{[water volume (gal) \times treatment concentration (mg/L) ÷ % active ingredient \times CF ÷ SG]} \\
= 634 \times 50 \div 0.35 \times 0.003785 \div 1.132 \\
= 303 \text{ mL}
\]

*Always refer to and follow all label instructions*
## Example Treatment Scenario and Suggested 35% PEROX-AID® Treatment Calculations*

### Charged Flow-Through Treatment

**Example:** You have a 6 ft diameter circular tank (water depth of 3 ft) containing a moderately high density of yellow perch fingerlings that have been diagnosed with external columnaris. Water flow into the tank is 10 gpm. Management has prescribed a treatment regimen of 50 mg/L hydrogen peroxide for 1 hour, and has determined that stocking density is such that a charged flow-through treatment is recommended. How much 35% PEROX-AID® (mL) must be added to “charge” the raceway to the prescribed treatment concentration? How much 35% PEROX-AID® (mL) must be “metered” into the tank inflow uniformly over the course of the 1 hour treatment duration to maintain the prescribed treatment concentration?

### Additional Information:

The volume of a circular tank (cylinder) is determined by the equation: Volume = \( \pi r^2 h \). \( \text{Note: } \pi = 3.14; r = \text{radius; and } h = \text{height (or depth)} \)

35% PEROX-AID® contains 35% hydrogen peroxide as the active ingredient (%AI). \( \text{Note: %AI expressed as 0.35 for calculation purposes} \)

Gallons per cubic foot = 7.48

The specific gravity (SG) of 35% PEROX-AID® = 1.132

Conversion Factor (CF) to convert gallons to milliliters = 0.003785

### Calculations:

**Volume of water (gal) in tank**

\[ \text{Volume} = \pi r^2 h \times 7.48 \text{ gal/ft}^3 \]

\[ = 3.14 \times 3^2 \times 3 \times 7.48 \]

\[ = 634 \text{ gallons} \]

**35% PEROX-AID® (mL) to “charge” tank**

\[ \text{35% PEROX-AID® (mL)} = \left[ \text{water volume (gal)} \times \text{treatment concentration (mg/L)} \div \% \text{ active ingredient} \times \text{CF} \div \text{SG} \right] \]

\[ = 634 \times 50 \div 0.35 \times 0.003785 \div 1.132 \]

\[ = 303 \text{ mL} \]

**35% PEROX-AID® (mL) “metered” into tank**

\[ \text{35% PEROX-AID® (mL)} = \left[ \text{water flow (gpm)} \times \text{treatment duration (min)} \times \text{treatment concentration (mg/L)} \div \% \text{AI} \times \text{CF} \div \text{SG} \right] \]

\[ = 10 \times 60 \times 50 \div 0.35 \times 0.003785 \div 1.132 \]

\[ = 287 \text{ mL} \]

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*Always refer to and follow all label instructions*
# Chloramine-T - External Bacteria

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
</table>
| **Halamid® Aqua**       | Freshwater-reared salmonids | Control of mortality due to bacterial gill disease associated with *Flavobacterium* spp. | - 12 - 20 mg/L for 60 min once daily on consecutive or alternate days for 3 treatments | - Preliminary testing on a small number of fish is recommended before treating an entire lot  
- If used in recirculating system, bypass biofilter during treatment and flushing  
- 0-day withdrawal time |
|                         | Walleye | Control of mortality due to external columnaris disease associated with *F. columnare* | - 10 - 20 mg/L for 60 min once daily on consecutive or alternate days for 3 treatments | - Preliminary testing on a small number of fish is recommended before treating an entire lot  
- Walleye fingerlings may be more sensitive than walleye fry  
- If used in recirculating system, bypass biofilter during treatment and flushing  
- 0-day withdrawal time |
|                         | Freshwater-reared warmwater finfish | - 20 mg/L for 60 min once daily on consecutive or alternate days for 3 treatments | | |
### Example Treatment Scenario and Suggested HALAMID® Aqua Treatment Calculations*

#### Static Bath Treatment

**Example:** You have a rectangular rearing tank containing a relatively low density of cutthroat trout fingerlings that have been diagnosed with bacterial gill disease. The tank measures 15 ft × 3 ft, with a water depth of 2.5 ft. Management has prescribed a treatment regimen of 12 mg/L chloramine-T for 1 hour, and has determined that rearing density is low enough to allow for a static bath treatment. How much chloramine-T (g) must be added to the tank to achieve the prescribed treatment concentration?

**Additional information:**
- Chloramine-T is considered 100% active ingredient
- Gallons per cubic foot = 7.48
- Conversion Factor (CF) to convert gallons to grams = 0.003785

**Calculations:**

\[ \text{Volume of water (gal) in tank} = \text{length (ft)} \times \text{width (ft)} \times \text{water depth (ft)} \times 7.48 \, \text{gal/ft}^3 \]
\[ = 15 \times 3 \times 2.5 \times 7.48 \]
\[ = 842 \, \text{gallons} \]

\[ \text{Halamid® Aqua (g) to add to tank} = \text{water volume (gal)} \times \text{treatment concentration (mg/L)} \times \text{CF} \]
\[ = 842 \times 12 \times 0.003785 \]
\[ = 38.2 \, \text{g} \]

*Always refer to and follow all label instructions*
### Example Treatment Scenario and Suggested HALAMID® AQUA Treatment Calculations*

**Charged Flow-Through Treatment**

**Example:**
You have a rectangular rearing tank containing a moderately high density of cutthroat trout fingerlings that have been diagnosed with bacterial gill disease. The tank measures 15 ft × 3 ft, with a water depth of 2.5 ft. Water flow into the tank is 20 gpm. Management has prescribed a treatment regimen of 12 mg/L chloramine-T for 1 hour, and has determined that stocking density is such that a charged flow-through treatment is recommended. How much Halamid® Aqua (g) must be added to “charge” the tank to the prescribed treatment concentration? How much Halamid® Aqua (g) must be “metered” into the tank inflow uniformly over the course of the 1 hour treatment duration to maintain the prescribed treatment concentration?

**Additional Information:**
Chloramine-T is considered 100% active ingredient

- Gallons per cubic foot = 7.48
- Conversion Factor (CF) to convert gallons to grams = 0.003785

**Calculations:**

1. **Volume of water (gal) in tank**
   \[
   \text{Volume} = (\text{length (ft)} \times \text{width (ft)} \times \text{water depth (ft)}) \times 7.48 \text{ gal/ft}^3
   \]
   \[
   = 15 \times 3 \times 2.5 \times 7.48
   \]
   \[
   = 842 \text{ gallons}
   \]

2. **Halamid® Aqua (g) to “charge” tank**
   \[
   \text{Halamid} = \text{water volume (gal)} \times \text{treatment concentration (mg/L)} \times \text{CF}
   \]
   \[
   = 842 \times 12 \times 0.003785
   \]
   \[
   = 38.2 \text{ g}
   \]

3. **Halamid® Aqua (g) “metered” into tank**
   \[
   \text{Halamid} = \text{water flow (gpm)} \times \text{treatment duration (min)} \times \text{treatment concentration (mg/L)} \times \text{CF}
   \]
   \[
   = 20 \times 60 \times 12 \times 0.003785
   \]
   \[
   = 54.5 \text{ g}
   \]

*Always refer to and follow all label instructions*
# Oxytetracycline Hydrochloride - Skeletal Marking

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENNOX® 343</td>
<td>Finfish fry and fingerlings</td>
<td>Mark skeletal tissue</td>
<td>• 200 - 700 mg oxytetracycline hydrochloride/L of water for 2 - 6 hr</td>
<td>• None</td>
</tr>
<tr>
<td>Pharmgate Animal Health</td>
<td>IVX Animal Health</td>
<td>1-800-759-3664</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxytetracycline HCl Soluble Powder-343¹</td>
<td>Finfish fry and fingerlings</td>
<td>Mark skeletal tissue</td>
<td>• 200 - 700 mg oxytetracycline hydrochloride/L of water for 2 - 6 hr</td>
<td>• None</td>
</tr>
<tr>
<td>TERRAMYCIN-343¹</td>
<td>Aquatic Health Resources</td>
<td>1-877-280-2858</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TETROXY® Aquatic Soluble Powder²</td>
<td>Finfish fry and fingerlings</td>
<td>Mark skeletal tissue</td>
<td>• 200 - 700 mg oxytetracycline hydrochloride (buffered)/L of water for 2 - 6 hr</td>
<td>• None</td>
</tr>
<tr>
<td>Bimeda</td>
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</tbody>
</table>

¹ Product is currently not available; future status unknown
² Product can be difficult to administer except in water with high natural buffering capacity
**Example Treatment Scenario and Suggested Oxytetracycline Hydrochloride Skeletal-Marking Treatment Calculations**

**Static Bath Treatment:**

**Example:** Your resource management objectives include the production of 10,000,000 walleye fry for stock enhancement, and require all fry be skeletal marked for later identification in the field. Management has prescribed a treatment regimen of 700 mg/L oxytetracycline hydrochloride (OTC) for 6 hours. Since your hatchery water has low natural buffering capacity, management has recommended treatment with Pennox 343® Soluble Powder. Fry will be marked in 3 ft × 10 ft rectangular tanks, with a water depth of 2 ft. Supplemental aeration will be provided to each treatment tank. How much Pennox® 343 Soluble Powder (g) needs to be added to each treatment tank?

**Additional Information:**
- Pennox 343® Soluble Powder contains 75.6% OTC as the active ingredient (%AI)  
  **Note:** %AI expressed as 0.756 for calculation purposes
- Gallons per cubic foot = 7.48
- Conversion Factor (CF) to convert gallons to grams = 0.003785

**Calculations:**

Volume of water (gal) in treatment tanks = [length (ft) × width (ft) × depth (ft) × 7.48 gal/ft³]
= 3 × 10 × 2 × 7.48
= 449 gallons

Amount of PENNOX® 343 Soluble Powder (g) to add to each tank = [water volume (gal) × treatment concentration (mg/L) × %AI × CF]
= 449 × 700 ÷ 0.756 × 0.003785
= 1,574 g

*Always refer to and follow all label instructions*
<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
</table>
| TRICAINES-S Western Chemical, Inc. 1-800-283-5292 | Fish (of the families Ictaluridae, Salmonidae, Esocidae, and Percidae), aquatic amphibians, and other aquatic poikilotherms | Temporary immobilization | - Fish: 15 - 330 mg/L  
- Other poikilotherms: 1:1,000 - 1:20,000 | - Crystalline powder to be mixed in water  
- Treatment dose depends upon desired degree of anesthesia, species, life stage, water temperature, and water hardness  
- Preliminary testing on a small number of fish is recommended  
- 21-day withdrawal time (fish)  
- Laboratory or hatchery use only in other poikilotherms  
- Water temperature over 50°F (10°C) |
**Example Treatment Scenario and Suggested Tricaine Methanesulfonate Treatment Calculations***

**Static Bath Treatment**

**Example:** Your resource management objectives include the production of 200,000 fin-clipped rainbow trout for stock enhancement. Management has prescribed the use of tricaine methanesulfonate (MS-222) at a treatment concentration of 80 mg/L to sedate fish prior to fin-clipping. Fish will be sedated in small lots utilizing “knockout” tubs containing 1.5 gallons of water. How much MS-222 (g) needs to be added to each knockout tub?

**Additional Information:** MS-222 is considered to be 100% active ingredient
Conversion Factor (CF) to convert gallons to grams = 0.003785

**Calculations:**

\[
\text{Amount of MS-222 to add to each knockout tub} = [\text{water volume (gal)} \times \text{treatment concentration (mg/L)} \times \text{CF}] \\
= 1.5 \times 80 \times 0.003785 \\
= 0.45 \text{ g}
\]

*Always refer to and follow label instructions*
<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater-reared salmonids</td>
<td>Control of mortality due to furunculosis associated with <em>Aeromonas salmonicida</em></td>
<td>• 10 - 15 mg florfenicol/kg fish per day for 10 consecutive days</td>
<td>• Veterinary Feed Directive (VFD) drug • 15-day withdrawal time</td>
<td></td>
</tr>
<tr>
<td>Freshwater-reared finfish</td>
<td>Control of mortality due to coldwater disease associated with <em>Flavobacterium psychrophilum</em></td>
<td>• 10 - 15 mg florfenicol/kg fish per day for 10 consecutive days</td>
<td>• VFD drug • 15-day withdrawal time</td>
<td></td>
</tr>
<tr>
<td>Catfish</td>
<td>Control of mortality due to columnaris disease associated with <em>Flavobacterium columnare</em></td>
<td>• 10 - 15 mg florfenicol/kg fish per day for 10 consecutive days</td>
<td>• VFD drug • 15-day withdrawal time</td>
<td></td>
</tr>
<tr>
<td>Freshwater-reared warmwater finfish</td>
<td>Control of mortality due to enteric septicemia associated with <em>Edwardsiella ictaluri</em></td>
<td>• 10 - 15 mg florfenicol/kg fish per day for 10 consecutive days</td>
<td>• VFD drug • 15-day withdrawal time</td>
<td></td>
</tr>
<tr>
<td>Freshwater-reared warmwater finfish</td>
<td>Control of mortality due to streptococcal septicemia associated with <em>Streptococcus iniae</em></td>
<td>• 15 mg florfenicol/kg fish per day for 10 consecutive days</td>
<td>• VFD drug • 15-day withdrawal time</td>
<td></td>
</tr>
</tbody>
</table>
### Example Treatment Scenario and Suggested AQUAFLOR® Treatment Calculations*

**Example:**

Your facility has a raceway containing 10,000 lb of coho salmon smolts that have been diagnosed with bacterial coldwater disease. The causative pathogen has been confirmed to be sensitive to florfenicol. The fish are being fed at a feed rate of 2% body weight per day. Your veterinarian has prescribed treatment with Aquaflor® at **10 mg florfenicol/kg fish per day** for 10 days. How many pounds of Aquaflor® medicated-feed will be needed for the treatment? How much Aquaflor® (g) will be needed to prepare the medicated-feed?

**Additional information:**
- Aquaflor® is a Veterinary Feed Directive (VFD) drug that can only be used in the context of a valid veterinarian-client-patient relationship.
- With respect to certain treatment calculations, the likelihood of obtaining accurate and consistent results can be greatly enhanced by the use of a simple “cheat sheet.” The table provided below is based on fish feed rate (expressed as % body weight per day), and for each given feed rate provides the amount of Aquaflor® (in g/lb of feed, g/kg of feed, and lb/ton of feed) that needs to be incorporated into medicated-feed to achieve a target dose of **10 mg florfenicol/kg fish per day**. **Note:** Read down columns.

<table>
<thead>
<tr>
<th>Feed Rate (% body weight per day)</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaflor® (g/lb of feed)</td>
<td>1.8144</td>
<td>0.9072</td>
<td>0.6048</td>
<td>0.4536</td>
<td>0.3629</td>
<td>0.3024</td>
<td>0.2592</td>
<td>0.2268</td>
<td>0.2016</td>
<td>0.1814</td>
<td>0.0907</td>
</tr>
<tr>
<td>Aquaflor® (g/kg of feed)</td>
<td>4.00</td>
<td>2.00</td>
<td>1.33</td>
<td>1.00</td>
<td>0.80</td>
<td>0.67</td>
<td>0.57</td>
<td>0.50</td>
<td>0.44</td>
<td>0.40</td>
<td>0.20</td>
</tr>
<tr>
<td>Aquaflor® (lb/ton of feed)¹</td>
<td>8.00</td>
<td>4.00</td>
<td>2.67</td>
<td>2.00</td>
<td>1.60</td>
<td>1.32</td>
<td>1.14</td>
<td>1.00</td>
<td>0.89</td>
<td>0.80</td>
<td>0.40</td>
</tr>
</tbody>
</table>

¹ Values in this row (i.e., lb/ton of feed) are the same as values presented in the table contained in the official VFD Form that must be used when ordering medicated feed.

**Calculations:**

- **Aquaflor® medicated-feed (lb) needed**
  
  \[
  \text{Aquaflor® medicated-feed (lb) needed} = \left( \text{total weight of fish (lb)} \times \text{feed rate (% BW per day)} \times \text{number of treatment days} \right) \div 100
  \]
  
  \[
  = 10,000 \times 0.02 \times 10
  \]
  
  \[
  = 2,000 \text{ lb}
  \]

- **Aquaflor® (g) needed to prepare medicated-feed**
  
  \[
  \text{Aquaflor® (g) needed to prepare medicated-feed} = \left( \text{total feed weight (lb)} \times \text{Aquaflor® (g) per lb of feed} \right)
  \]
  
  \[
  = 2,000 \times 0.4536
  \]
  
  \[
  = 907 \text{ g}
  \]

**Note:** See page 10-1 for formula to assist in Aquaflor® medicated-feed treatment calculations

*Always refer to and follow all label instructions*
### Example Treatment Scenario and Suggested AQUAFLOR® Treatment Calculations*

**Example:**
Your facility has a raceway containing 10,000 lb of coho salmon smolts that have been diagnosed with bacterial coldwater disease. The causative pathogen has been confirmed to be sensitive to florfenicol. The fish are being fed at a feed rate of 2% body weight per day. Your veterinarian has prescribed treatment with Aquaflor® at **15 mg florfenicol/kg fish per day** for 10 days. How many pounds of Aquaflor® medicated-feed will be needed for the treatment? How much Aquaflor® (g) will be needed to prepare the medicated-feed?

**Additional information:**
- Aquaflor® is a Veterinary Feed Directive (VFD) drug that can only be used in the context of a valid veterinarian-client-patient relationship.
- With respect to certain treatment calculations, the likelihood of obtaining accurate and consistent results can be greatly enhanced by the use of a simple "cheat sheet." The table provided below is based on fish feed rate (expressed as % body weight per day), and for each given feed rate provides the amount of Aquaflor® (in g/lb of feed, g/kg of feed, and lb/ton of feed) that needs to be incorporated into medicated-feed to achieve a target dose of **15 mg florfenicol/kg fish per day**. **Note:** Read down columns.

<table>
<thead>
<tr>
<th>Feed Rate (% body weight per day)</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaflor® (g/lb of feed)</td>
<td>2.72</td>
<td>1.36</td>
<td>0.91</td>
<td>0.69</td>
<td>0.54</td>
<td>0.45</td>
<td>0.39</td>
<td>0.34</td>
<td>0.30</td>
<td>0.27</td>
<td>0.14</td>
</tr>
<tr>
<td>Aquaflor® (g/kg of feed)</td>
<td>6.00</td>
<td>3.00</td>
<td>2.00</td>
<td>1.50</td>
<td>1.20</td>
<td>1.00</td>
<td>0.86</td>
<td>0.75</td>
<td>0.67</td>
<td>0.60</td>
<td>0.30</td>
</tr>
<tr>
<td>Aquaflor® (lb/ton of feed)³</td>
<td>12.00</td>
<td>6.00</td>
<td>4.00</td>
<td>3.00</td>
<td>2.40</td>
<td>1.98</td>
<td>1.71</td>
<td>1.50</td>
<td>1.33</td>
<td>1.20</td>
<td>0.60</td>
</tr>
</tbody>
</table>

³ Values in this row (i.e., lb/ton of feed) are the same as values presented in the table contained in the official VFD Form that must be used when ordering medicated feed.

**Calculations:**

- **Aquaflor® medicated-feed (lb) needed**
  \[
  \text{Aquaflor® medicated-feed (lb) needed} = [\text{total weight of fish (lb)} \times \text{feed rate (% BW per day)}] \times \text{number of treatment days}
  \]
  \[
  = 10,000 \times 0.02 \times 10
  \]
  \[
  = 2,000 \text{ lb}
  \]

- **Aquaflor® (g) needed to prepare medicated-feed**
  \[
  \text{Aquaflor® (g) needed to prepare medicated-feed} = [\text{total feed weight (lb)} \times \text{Aquaflor® (g) per lb of feed}]
  \]
  \[
  = 2,000 \times 0.6804
  \]
  \[
  = 1,361 \text{ g}
  \]

**Note:** See page 10-1 for formula to assist in Aquaflor® medicated-feed treatment calculations

*Always refer to and follow all label instructions*
### Oxytetracycline Dihydrate - Bacterial Diseases

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERRAMYCIN® 200 for Fish</strong>&lt;br&gt;Phibro Animal Health&lt;br&gt;1-888-475-7355</td>
<td>Catfish</td>
<td>Control of bacterial hemorrhagic septicemia <em>(Aeromonas liquefaciens)</em> and pseudomonas disease <em>(Pseudomonas spp.)</em></td>
<td>• 2.5 - 3.75 g OTC(^1)/100 lb fish per day for 10 days</td>
<td>• Water temperature not below 62°F (16.7°C)&lt;br&gt;• 21-day withdrawal time</td>
</tr>
<tr>
<td></td>
<td>Lobster</td>
<td>Control of gaffkemia <em>(Aerococcus viridians)</em></td>
<td>• 1 g OTC/lb medicated feed for 5 days</td>
<td>• In feed as sole ration&lt;br&gt;• 30-day withdrawal time</td>
</tr>
</tbody>
</table>

\(^1\) Oxytetracycline dihydrate
<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERRAMYCIN® 200 for Fish&lt;br&gt;Phibro Animal Health&lt;br&gt;1-888-475-7355</td>
<td>Salmonids</td>
<td>Control of ulcer disease (<em>Hemophilus piscium</em>), furunculosis (<em>Aeromonas salmonicida</em>), bacterial hemorrhagic septicemia (<em>A. liquefaciens</em>), and pseudomonas disease (<em>Pseudomonas</em> spp.)</td>
<td>• 2.5 - 3.75 g OTC(^1)/100 lb fish per day for 10 days</td>
<td>• 21-day withdrawal time&lt;br&gt;• No temperature restrictions on use</td>
</tr>
<tr>
<td></td>
<td>Freshwater-reared salmonids</td>
<td>Control of mortality due to coldwater disease caused by <em>Flavobacterium psychrophilum</em></td>
<td>• 3.75 g OTC/100 lb fish per day for 10 days</td>
<td>• 21-day withdrawal time&lt;br&gt;• No temperature restrictions on use</td>
</tr>
<tr>
<td></td>
<td>All freshwater-reared <em>Oncorhynchus mykiss</em></td>
<td>Control of mortality due to columnaris disease (<em>F. columnare</em>)</td>
<td>• 3.75 g OTC/100 lb fish per day for 10 days</td>
<td>• 21-day withdrawal time&lt;br&gt;• No temperature restrictions on use</td>
</tr>
</tbody>
</table>

\(^1\) Oxytetracycline dihydrate
# Oxytetracycline Dihydrate - Skeletal Marking

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERRAMYCIN® 200</strong></td>
<td>Pacific salmon</td>
<td>Mark skeletal tissue</td>
<td>• 11.35 g OTC(^1)/100 lb fish per day for 4 days</td>
<td>• Salmon not over 30 g body weight&lt;br&gt;• In feed as sole ration&lt;br&gt;• 7-day withdrawal time</td>
</tr>
<tr>
<td>for Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phibro Animal Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-888-475-7355</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Oxytetracycline dihydrate
**Example Treatment Scenario and Suggested TERRAMYCIN® 200 for Fish Treatment Calculations**

**Example:**
Your facility has a raceway containing 2,000 lb of fingerling cutthroat trout that have been diagnosed with bacterial coldwater disease. The causative pathogen has been confirmed to be sensitive to oxytetracycline (OTC). The fish are being fed at a feed rate of 3% body weight per day. Your fish health biologist has recommended treatment with Terramycin® 200 for Fish (TM200) at 3.75 g OTC/100 lb fish per day for 10 days. What %TM200 in feed should you order? At what feed rate should the TM200 medicated-feed be fed? How many pounds of TM200 medicated-feed will be needed for the treatment?

**Additional Information:**
- Most feed manufacturers only offer (prepare) TM200 medicated-feed at specific, pre-determined levels of %TM200 in feed. As a result, accurate dosing as per label instructions requires the use of only specified feed rates (or feed rate ranges if dose is a range) for each level of %TM200 in feed. The take-home message is that culturists must often adjust “preferred feed rate” to meet treatment objectives and label use-guidelines; most notably when the treatment dose is a specific value (e.g., 3.75 g OTC/100 lb fish per day). Also note that if feed rate must be adjusted, it should always be adjusted to a value less than preferred to ensure fish consume all medicated-feed. If desirable, non-medicated feed can be fed to fish after medicated-feed each day to achieve preferred feed rate.
- The table provided below is based on the most commonly prepared %TM200 levels in feed, and for each given %TM200 level, provides the appropriate feed rate (or feed rate range) that should be used to achieve a target dose of 2.5 g, 3.75 g, or 2.5 – 3.75 g OTC/100 lb fish per day. Note: Read down columns.

<table>
<thead>
<tr>
<th>% TM200 in Feed</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed rate (OTC)</td>
<td>2.5</td>
<td>1.25</td>
<td>0.83</td>
<td>0.62</td>
<td>0.5</td>
<td>0.42</td>
<td>0.36</td>
<td>0.31</td>
</tr>
<tr>
<td>Feed rate (OTC)</td>
<td>3.75</td>
<td>1.87</td>
<td>1.25</td>
<td>0.94</td>
<td>0.75</td>
<td>0.62</td>
<td>0.54</td>
<td>0.47</td>
</tr>
<tr>
<td>Feed rate (OTC)</td>
<td>2.5 - 3.75</td>
<td>1.25 - 1.87</td>
<td>0.83 - 1.25</td>
<td>0.62 - 0.94</td>
<td>0.5 - 0.75</td>
<td>0.42 - 0.62</td>
<td>0.36 - 0.54</td>
<td>0.31 - 0.47</td>
</tr>
</tbody>
</table>

**Calculations:**

\[
\text{%TM200 in feed to order (suggested)} = 1\% \text{ TM200}
\]

\[
\text{Feed rate (TM200 medicated-feed)} = 1.87\% \text{ body weight per day}^1
\]

\[
\text{TM200 medicated-feed (lb) needed} = [\text{total weight of fish} (\text{lb}) \times \text{feed rate} (\% \text{BW per day}) \times \text{number of treatment days}]
\]

\[
= 2,000 \times 0.0187 \times 10
\]

\[
= 374 \text{ lb}
\]

^1 To achieve preferred feed rate, non-medicated feed can be fed at 1.13% BW each day after medicated-feed has been fed; 1.87% + 1.13% = 3.0%

**Note:** See page 10-1 for formula to assist in Terramycin® 200 for Fish medicated-feed treatment calculations

*Always refer to and follow label instructions*
### Sulfadimethoxine & Ormetoprim

<table>
<thead>
<tr>
<th>Product Name &amp; Supplier</th>
<th>Species</th>
<th>Indication</th>
<th>Dosing</th>
<th>Limitations &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROMET® 30</strong>&lt;br&gt;Aquatic Health Resources&lt;br&gt;1-877-280-2858</td>
<td>Salmonids</td>
<td>Control of furunculosis caused by <em>Aeromonas Salmonicida</em></td>
<td>• 50 mg/kg fish per day for 5 days</td>
<td>• In feed&lt;br&gt;• 42-day withdrawal time</td>
</tr>
<tr>
<td><strong>ROMET® TC</strong>&lt;br&gt;Aquatic Health Resources&lt;br&gt;1-877-280-2858</td>
<td>Catfish</td>
<td>Control of enteric septicemia caused by <em>Edwardsiella ictaluri</em></td>
<td>• 50 mg/kg fish per day for 5 days</td>
<td>• In feed&lt;br&gt;• 3-day withdrawal time</td>
</tr>
</tbody>
</table>
**Example Treatment Scenario and Suggested ROMET® 30 Treatment Calculations**

**Example:**
Your facility has a raceway containing 4,000 lb of juvenile lake trout that have been diagnosed with furunculosis. The causative pathogen has been confirmed to be sensitive to Romet® 30. The fish are being fed at a feed rate of 2% body weight per day. Your fish health biologist has recommended treatment with Romet® 30 at 50 mg/kg fish per day for 5 days. How many pounds of Romet® 30 medicated-feed will be needed for the treatment? How much Romet® 30 (g) will be needed to prepare the medicated-feed?

**Additional information:**
- Romet® 30 is a dry medicated premix, and is available as an over-the-counter product. Romet® 30 medicated-feed may be purchased from a licensed feed mill, or may be prepared on-site by top-dressing standard ration.
- With respect to certain treatment calculations, the likelihood of obtaining accurate and consistent results can be greatly enhanced by the use of a simple “cheat sheet.” The table provided below is based on fish feed rate (expressed as % body weight per day), and for each given feed rate provides the amount of Romet® 30 (in g/lb of feed, g/kg of feed, and lb/ton of feed) that needs to be incorporated into medicated-feed to achieve a target dose of 50 mg Romet® 30/kg fish per day. **Note:** Read down columns.

<table>
<thead>
<tr>
<th>Feed Rate (% body weight per day)</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romet® 30 (g/lb of feed)</td>
<td>15.12</td>
<td>7.56</td>
<td>5.04</td>
<td>3.78</td>
<td>3.02</td>
<td>2.52</td>
<td>2.16</td>
<td>1.89</td>
<td>1.68</td>
<td>1.51</td>
<td>0.76</td>
</tr>
<tr>
<td>Romet® 30 (g/kg of feed)</td>
<td>33.33</td>
<td>16.67</td>
<td>11.11</td>
<td>8.33</td>
<td>6.67</td>
<td>5.56</td>
<td>4.76</td>
<td>4.17</td>
<td>3.70</td>
<td>3.33</td>
<td>1.67</td>
</tr>
<tr>
<td>Romet® 30 (lb/ton of feed)</td>
<td>66.67</td>
<td>33.33</td>
<td>22.22</td>
<td>16.67</td>
<td>13.33</td>
<td>11.11</td>
<td>9.52</td>
<td>8.33</td>
<td>7.41</td>
<td>6.67</td>
<td>3.33</td>
</tr>
</tbody>
</table>

^1 Values in this row (i.e., lb per ton) are similar to values presented on the drug label.

**Calculations:**
- **Romet® 30 medicated-feed (lb) needed** = \[\text{total weight of fish (lb)} \times \text{feed rate (%BW per day)} \times \text{number of treatment days}\]
  = \[4,000 \times 0.02 \times 5\]
  = 400 lb

- **Romet® 30 (g) needed to prepare medicated feed** = \[\text{total feed weight (lb)} \times \text{Romet® 30 (g) per lb of feed}\]
  = \[400 \times 3.78\]
  = 1,512 g

**Note:** See page 10-1 for formula to assist in Romet® 30 medicated-feed treatment calculations  *Always refer to and follow label instructions*
**Example Treatment Scenario and Suggested Romet® TC Treatment Calculations***

**Example:**
Your facility has a raceway containing 4,000 lb of juvenile lake trout that have been diagnosed with furunculosis. The causative pathogen has been confirmed to be sensitive to Romet® TC. The fish are being fed at a feed rate of 2% body weight per day. Your fish health biologist has recommended treatment with Romet® TC at 50 mg/kg fish per day for 5 days. How many pounds of Romet® TC medicated-feed will be needed for the treatment? How much Romet® TC (g) will be needed to prepare the medicated-feed?

**Additional Information:**
- Romet® TC is a medicated premix that is added to water and then “top-coated” on feed. Romet® TC is available as an over-the-counter product, and is intended for “on-site” top-coating of standard rations.
- With respect to certain treatment calculations, the likelihood of obtaining accurate and consistent results can be greatly enhanced by the use of a simple “cheat sheet.” The table provided below is based on fish feed rate (expressed as % body weight per day), and for each given feed rate provides the amount of Romet® TC (in g/lb of feed, g/kg of feed, and lb/ton of feed) that needs to be incorporated into medicated-feed to achieve a target dose of 50 mg Romet® TC/kg fish per day. **Note:** Read down columns.

<table>
<thead>
<tr>
<th>Feed Rate (% body weight per day)</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romet® TC (g/lb of feed)</td>
<td>22.68</td>
<td>11.34</td>
<td>7.56</td>
<td>5.67</td>
<td>4.54</td>
<td>3.78</td>
<td>3.24</td>
<td>2.83</td>
<td>2.52</td>
<td>2.27</td>
<td>1.13</td>
</tr>
<tr>
<td>Romet® TC (g/kg of feed)</td>
<td>50.00</td>
<td>25.00</td>
<td>16.67</td>
<td>12.50</td>
<td>10.00</td>
<td>8.33</td>
<td>7.14</td>
<td>6.25</td>
<td>5.56</td>
<td>5.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Romet® TC (lb/ton of feed)</td>
<td>100.00</td>
<td>50.00</td>
<td>33.33</td>
<td>25.00</td>
<td>20.00</td>
<td>16.67</td>
<td>14.29</td>
<td>12.50</td>
<td>11.11</td>
<td>10.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>

1 Values in this row (i.e., lb per ton) are similar to values presented on the drug label.

**Calculations:**
- **Romet® TC medicated-feed (lb) needed** = [total weight of fish (lb) × feed rate (%BW per day) × number of treatment days]  
  = 4,000 × 0.02 × 5  
  = 400 lb

- **Romet® TC (g) needed to prepare medicated feed** = [total feed weight (lb) × Romet® TC (g) per lb of feed]  
  = 400 × 5.67  
  = 2,268 g

**Note:** See page 10-1 for formula to assist in Romet® TC medicated-feed treatment calculations  
*Always refer to and follow label instructions*
**Formulae to Assist in Medicated-Food Treatment Calculations**

The following formulae (equations) provide a simple means of calculating either 1) the feed rate (percent body weight to feed each day), or 2) the percent drug premix incorporated into feed. As presented, the formulae are arranged to solve for feed rate (% BW per day). However, as in the case of any algebraic formulae, each formula can be rearranged to solve for any other variable.

<table>
<thead>
<tr>
<th>Medicated Feed Type</th>
<th>Formula</th>
<th>Footnotes</th>
</tr>
</thead>
</table>
| Terramycin® 200 for Fish (TM200)         | Feed Rate (% BW per day) = \( \frac{22.03^{[1]} \times \text{Treatment dose (g OTC/100 lb fish)}}{\% \text{TM200 in feed}^{[2]} \times 44.1^{[3]}} \) | ¹ Algebraic conversion factor (constant)  
² e.g., 2% TM200 = 2; 2% TM200 ≠ 0.02  
³ % OTC in TM200 (constant) |

**Note:** Most feed mills will sell TM200-mediated feed labeled at 1%, 2%, 3%, or 4% TM200 in the feed. However, some feed mills will sell TM200-mediated feed labeled at 2g, 4g, 6 g, or 8g OTC/lb feed. For the TM200 calculations performed above, please note that 2 g OTC/lb feed = 1% TM200, 4 g OTC/lb feed = 2% TM200, 6 g OTC/lb feed = 3% TM200, and 8 g OTC/lb feed = 4% TM200.

| Aquaflor®, Romet® 30 and Romet® TC[^1] | Feed Rate (% BW per day) = \( \frac{\text{Treatment dose (mg active ingredient/kg fish)}}{\% \text{drug premix in feed}^{[2]} \times \% \text{active ingredient in premix}^{[3]}} \) | ¹ Aquaflor® is 50% active ingredient  
² Romet® 30 is 30% active ingredient  
³ Romet® TC is 20% active ingredient  
² e.g., 2% premix = 2; 2% premix ≠ 0.02  
³ e.g., 50% active = 50; 50% active ≠ 0.50 |

**Note:** This formula also applies to future FDA-approved medicated feed products where treatment dose is expressed as mg/kg fish. If treatment dose is expressed as µg/kg fish, simply divide by 1,000. If treatment dose is expressed as g/kg fish, simply multiply by 1,000.
**Additional Drug-Use Guidance**

- **Product Labels:** Each product’s label should be considered the definitive source of specific instructions for product use. *Always refer to the product label before initiating treatment.*

- **Veterinary Feed Directive (VFD) Drugs (e.g., Aquaflor®):** VFD drugs are a certain subset of drugs that are intended for use in animal feeds. The use of VFD drugs is permitted only under the professional supervision of a licensed veterinarian in the context of a valid veterinarian-client-patient relationship. VFD drugs cannot be used under extra-label drug use provisions.

- **Prescription Drugs (e.g., Chorulon®):** Prescription drugs are drugs that may be used only by, or on the order of, a licensed veterinarian in the context of a valid veterinarian-client-patient relationship.

- **Extra-label Drug Use:** The actual or intended use of an FDA-approved drug in a manner that is not in accordance with the approved label directions. Extra-label drug use is permitted only by, or on the order of, a licensed veterinarian when a valid veterinarian-client-patient relationship exists.

- **Calculations:** The treatment calculations provided in this Desk Reference are intended to serve as an example of one method to correctly determine the amount of a drug needed for use in a specific treatment situation. Regardless of how you may choose to calculate the amount of drug needed for treatment, always refer to and follow all product label instructions.

- **Additional Information:** Additional information regarding approved drug use, including a variety of drug use related guidance documents, can be found by visiting the FDA ([http://www.fda.gov/AnimalVeterinary/default.htm](http://www.fda.gov/AnimalVeterinary/default.htm)) and AADAP ([http://www.fws.gov/fisheries/aadap/home.htm](http://www.fws.gov/fisheries/aadap/home.htm)) websites.

- **Disclaimer:** Use of a product name does not indicate endorsement by the U.S. Fish and Wildlife Service, the American Fisheries Society, or the Association of Fish and Wildlife Agencies.
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