ELANCO CATTLE VACCINE PORTFOLIO

VIRA SHIELD

Elanco

Titanium

SCOUR BOS

FULL VALUE BEEF
The Vira Shield® line of inactivated vaccines provides flexible, safe and powerful protection against up to 13 respiratory, reproductive and leptospirosis diseases. Easy to implement in any management program or whole-herd protocol, Vira Shield 6 combinations can be safely used in pregnant cows, heifers and calves nursing pregnant cows. A vaccine brand of choice for pregnant females, Vira Shield has a leading reputation for reproductive safety and peace of mind.

Research shows Vira Shield vaccines:

- Deliver enhanced infectious bovine rhinotracheitis (IBR) fetal protection eight months post-vaccination
- Provide 12-month duration of immunity for LHB, the most common cause of leptospirosis in the U.S.
- Help prime the immune system of young calves even in the face of antibodies from the cow’s colostrum

Vira Shield also contains the Xtend® adjuvant, which helps boost general immune response and release antigens over time.

Figure 1. Respiratory Clinical Scores Following Bovine Viral Diarrhea Virus (BVDV) Challenge

Keeping cattle healthy throughout their lives is critically important to their performance and your bottom line. That’s why Elanco is dedicated to expanding its vaccine portfolio to ensure the health needs of your cattle can be met — at every stage of production, no matter your operation’s needs.

We want to help you keep cattle healthy, which is why we continue to invest in research and development. Meeting your needs by delivering:

- A new vaccine research and development facility
- Technological advancements to existing production sites
- Highly qualified experts added to our existing technical teams

This is just a small fraction of the work being done to ensure we meet the needs of the cattle producers and help you stay profitable.
Keeping cattle healthy throughout their lives is critically important to their performance and your bottom line. That’s why Elanco is dedicated to expanding its vaccine portfolio to ensure the health needs of your cattle can be met — at every stage of production, no matter your operation’s needs.

We want to help you keep cattle healthy, which is why we continue to invest in technological advancements, talented people and continued innovations can be seen in many ways:

- A new vaccine research and development facility
- Technological advancements to existing production sites
- Highly qualified experts added to our existing technical consultant, production and research teams

This is just a small fraction of the work being done to ensure we offer a broad, innovative portfolio of health management products to help you stay profitable.

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Titanium® vaccines are tough on respiratory and reproductive disease pathogens — but easy on your cattle.* Titanium does not impact feed intake and results in little to no post-treatment side effects, so you can keep cattle on track with health management solutions that do not interrupt your day-to-day operations or affect your bottom line.6*

Research shows that Titanium vaccines:
- Do not affect feed intake6
- Do not cause post-vaccinal stress as measured by body temperature, feed intake, injection-site reaction or white blood cell count (Table 1)6-9
- Are safe for use in nursing calves and during pregnancy provided they were vaccinated according to label directions with Titanium 3, 4 L5, 5 or 5 L5 HB10**
- Do not affect milk production11

| Table 1. Impact of Titanium 5 on mean dry-matter intake (lbs) |
|---------------------------------|-----------------|-----------------|
| Days post-vaccination           | Titanium 5      | Control (saline solution) |
| Days 1-4                        | 26.8a           | 26.1a           |
| Days 1-5                        | 26.9a           | 26.3a           |
| Days 1-10                       | 26.6a           | 26.4a           |
| Days 1-29                       | 27.0a           | 26.9a           |

*Different superscripts within each row indicate statistical significance (P < 0.05).

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Single vaccine with protection against viruses and bacteria

Titanium 5 + PH-M, the newest Titanium vaccine, helps cattle overcome the one-two punch of bacteria and viruses. This innovative product provides a broad immune response against the bacteria and viruses most associated with bovine respiratory disease (BRD) in a single vaccine for cattle as young as 2 months of age.12-15

Titanium 5 + PH-M protects against economically important virus strains, as well as the two bacteria most associated with BRD:12-14, 16
  - Mannheimia haemolytica — the bacterium most frequently isolated from lungs of cattle with BRD
  - Pasteurella multocida — an important cause of bacterial pneumonia

Research shows that the vaccine is safe and effective for cattle 60 days of age or older with no interference between the viral and bacterial components of the vaccine.

*As measured by body temperature, feed intake, injection-site reaction or white blood cell count.
**Do not use Titanium BRSV 3, Titanium 3 LP, Titanium 3, Titanium IBR LP and Titanium IBR in pregnant cows or in calves nursing pregnant cows. Abortions may result.
Scour Bos® — powerful scours protection at preg-check

Scour Bos® is the only scours vaccine that delivers powerful protection with the convenience and flexibility to administer at preg-check. Scours, or calf diarrhea, is a common result of bacterial and viral infections in the lining of calves’ intestines. Calves are especially vulnerable because they face many stressors in the first few hours of life and their young immune systems have not yet fully developed.

Scour Bos provides broad-spectrum flexible protection, including:
- Protection against the primary causes of scours — coronavirus, rotavirus, K99 E. coli bacteria and Clostridium perfringens Type C
- Three-way rotavirus protection
- More E. coli isolates than any other scours vaccine
- The longest vaccination window of any scours vaccine — up to 16 weeks pre-calving†

### Table 2. Scour Bos E. coli challenge results

<table>
<thead>
<tr>
<th>Group</th>
<th>% Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinates</td>
<td>0</td>
</tr>
<tr>
<td>Controls</td>
<td>70</td>
</tr>
</tbody>
</table>

*P < 0.001.

### Table 3. Rotavirus challenge results

<table>
<thead>
<tr>
<th>Vaccinates’ geometric mean titers</th>
<th>Dehydration difference</th>
<th>Depression difference</th>
<th>Clinical difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf serum</td>
<td>9x increase over controls</td>
<td>7x increase over controls</td>
<td>P &lt; 0.01</td>
</tr>
<tr>
<td>Dam colostrum</td>
<td></td>
<td></td>
<td>P &lt; 0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P &lt; 0.01</td>
</tr>
</tbody>
</table>

*16-week vaccination window for initial vaccination. In subsequent years, administer up to 10 weeks pre-calving.

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**CONVENIENT, FLEXIBLE VACCINATION WINDOW WITH SCOUR BOS**

**INITIAL VACCINATION FLEXIBILITY (WEEKS PRIOR TO CALVING)**
- Scour Bos® 9 up to 16 weeks
- ScourGuard® 4KC up to 9 weeks
- Guardian® up to 12 weeks

**ANNUAL VACCINATION FLEXIBILITY (WEEKS PRIOR TO CALVING)**
- Scour Bos® 10 weeks
- ScourGuard® 6 weeks
- Guardian® 7 weeks
The first-ever pneumonia vaccine developed for cattle in the U.S. market using recombinant technology, which means you’re getting the purest antigen form available.

An effective footrot protection strategy with a broad window of administration that contains the only *Fusobacterium necrophorum* bacterin designed specifically for cattle.

A pinkeye vaccine that contains four field isolates of *Moraxella bovis*, the primary cause of pinkeye

### Recommended protocols to meet your operation’s needs

Below are some suggested protocols to fit into your health management program. Work with your veterinarian to ensure you’ve chosen the best protocols for your operation.

<table>
<thead>
<tr>
<th>Disease Segment</th>
<th>Calves</th>
<th>Heifers</th>
<th>Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5</td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td>_branding/turnout</td>
<td>Vira Shield 6</td>
<td>Vira Shield 6</td>
<td>Vira Shield 6</td>
</tr>
<tr>
<td>Preweaning</td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5</td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td>Weaning</td>
<td>Titanium 5</td>
<td>Vira Shield 6</td>
<td>Vira Shield 6</td>
</tr>
<tr>
<td>Prebreeding</td>
<td>Titanium 5 L5 HB</td>
<td>Titanium 5 L5 HB</td>
<td>Titanium 5 L5 HB</td>
</tr>
<tr>
<td>Preg check</td>
<td>Master Guard 10 HB</td>
<td>Master Guard 10 HB</td>
<td>Master Guard 10 HB</td>
</tr>
<tr>
<td>Precalving</td>
<td>Vira Shield 6+L5 HB</td>
<td>Vira Shield 6+L5 HB</td>
<td>Vira Shield 6+L5 HB</td>
</tr>
</tbody>
</table>

#### Calf Diarrhea (Scours)
- Bovine Ecolizer®
- Bovine Pili Shield®
- Scour Bos

#### Clostridial
- Clostratox®
- Clostri Shield®
- Clostridium Perfringens Type A Toxoid

#### Reproductive
- Lepto Shield®
- Master Guard
- ReproSTAR®
- Vib Shield®
- Titanium
- Vira Shield

#### Other
- Pinkeye Shield®
- Fusogard®

### Additional solutions to manage a broad spectrum of diseases

- **NUPLURA PH**
  - The first-ever pneumonia vaccine developed for cattle in the U.S. market using recombinant technology, which means you’re getting the purest antigen form available.

- **FUSOGARD®**
  - An effective footrot protection strategy with a broad window of administration that contains the only *Fusobacterium necrophorum* bacterin designed specifically for cattle.

- **PINKEYE SHIELD®**
  - A pinkeye vaccine that contains four field isolates of *Moraxella bovis*, the primary cause of pinkeye.

### Disease Management Protocols

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<th>Cows</th>
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<tr>
<td><strong>Respiratory</strong></td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5</td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td><strong>Reproductive</strong></td>
<td>Vira Shield 6+L5 HB</td>
<td>Vira Shield 6+L5 HB</td>
<td>Vira Shield 6+L5 HB</td>
</tr>
<tr>
<td>(replacement females)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scours</strong></td>
<td>Scour Bos 9</td>
<td>Scour Bos 4</td>
<td>Scour Bos 9</td>
</tr>
<tr>
<td><strong>Pneumonia</strong></td>
<td>NUPLURA PH</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Footrot</strong></td>
<td>Fusogard (2 doses)</td>
<td></td>
<td>Fusogard (2 doses)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disease Segment</th>
<th>Bulls</th>
<th>Stocker</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td><strong>Reproductive</strong></td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td>(replacement females)</td>
<td>Master Guard 5™</td>
<td>Master Guard 5™</td>
</tr>
<tr>
<td><strong>Scours</strong></td>
<td>NUPLURA PH</td>
<td></td>
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<thead>
<tr>
<th>Disease Segment</th>
<th>Feedyard</th>
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<tr>
<td><strong>Respiratory</strong></td>
<td>Titanium 5+PH-M</td>
</tr>
<tr>
<td></td>
<td>Titanium 4 L5</td>
</tr>
<tr>
<td></td>
<td>Titanium 3 LP</td>
</tr>
<tr>
<td></td>
<td>Titanium 3</td>
</tr>
<tr>
<td><strong>Footrot</strong></td>
<td>Fusogard</td>
</tr>
<tr>
<td><strong>Pneumonia</strong></td>
<td>NUPLURA PH</td>
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<table>
<thead>
<tr>
<th>Disease Segment</th>
<th>Arrive</th>
<th>Revaccinate (2-4 weeks)</th>
<th>Reimplanting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5+PH-M</td>
<td>Titanium 5+PH-M</td>
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<tr>
<td></td>
<td>Titanium 4 L5</td>
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<tr>
<td></td>
<td>Titanium 3 LP</td>
<td>Titanium 3 LP</td>
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<td>Fusogard</td>
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**Vira Shield 6+L5 HB** may be used if cows are artificially inseminated.

**Master Guard** may be used in calves at least 5 months of age.
Discovering opportunities to improve profitability

Whether it’s a new vaccine or the quality products you’ve come to depend upon, Elanco provides you with the added support of Full Value Beef™. In addition to a full line of health management solutions and a technical team to help you make informed decisions, Elanco also has analytics experts ready to help you identify the economic factors that create more profit opportunities for your operation. For more information, talk to your Elanco sales representative or technical consultant.

The label contains complete use information, including cautions and warnings. Always read, understand and follow the labels and use directions.

For Titanium: Precautions: Do not use Titanium BRSV 3, Titanium 3 LP, Titanium 3, Titanium IBR LP and Titanium IBR in pregnant cows or in calves nursing pregnant cows. Abortions may result.

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8Terhaar, B. “Effect of vaccination with Titanium 5.” Study No. TR-11. Published by Agri Laboratories Ltd.
9Terhaar, B. 1998. “Final report of field safety evaluation of Titanium 5 LS.” Study No. TR-03. Published by Agri Laboratories Ltd.
10Field Safety Evaluation of Titanium 5 LS HB Vaccines in Pregnant Cows. Titanium Study No. 02-11 Revision No.1.
12Milliken, G. 2013. “Mannheimia haemolytica efficacy studies demonstrating the absence of excessive interference of Titanium products with the Mannheimia haemolytica-Pasteurella multocida bacterin-toxoid.”
13Demonstration of the compatibility of components between APHIS product codes 1181.20 (Establishment 213) and G055.04 (Establishment 315) APHIS product code 45B9.20.” Study No. 2010-01 Rev. 1.
14Efficacy study for BRSV fraction to demonstrate compatibility of the BRSV component in APHIS product code: 45B9.20 (unlicensed).” Study No. 2011-05 Rev. 1.
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