February 16, 2006

- The new standard applies to ALL mattresses and mattress/foundation sets sold in the United States on or after July 1, 2007.
Observations

- 16 CFR Part 1633 does NOT replace the current 16 CFR Part 1632 cigarette ignition standard.
- It is NOT the same as California Technical Bulletin 603.
- 1633 requires prototype certification, a quality assurance program and detailed recordkeeping.
Starting the Compliance Process
Starting the Compliance Process

- Select “point person” for FR program
  - Responsible for reviewing, understanding and explaining all parts of 16 CFR Part 1633
  - Responsible for coordinating ALL aspects of the compliance program within your company
- Determine Timeline for Implementation
  - Mandatory Compliance Date: July 1, 2007
  - How much time do I need to switch out current line with new FR line?
  - When will I introduce new product line to my retailers?
Timeline for Implementation

1633 Timeline to Meet Compliance Date

- **Jan-07**: Start date
- **Jun-06**: Mandatory compliance all products
- **Aug-06**: Product presentations
- **Sep-06**: Begin shipping new FR line to retailers

Timeline: Jun-06 to Jul-07
1633 Timeline to Meet Compliance Date

- **Start Date**
- **Mandatory Compliance All Products**
- **16 CFR 1633 Program Implementation**
- **Product Presentations**
- **Begin Shipping New FR Line to Retailers**
1633 Timeline to Meet Compliance Date

**Timeline – Strategic Approach**

- **May-06**: Product Line Analysis
- **Jun-06**: FR Systems review, order components
- **Jul-06**: Full Scale Screen Testing
- **Aug-06**: Sales & Marketing sample review
- **Sep-06**: Final FR systems review & selection
- **Oct-06**: Review prototype requirements
- **Nov-06**: Begin prototype testing and record keeping
- **Dec-06**: Manufacturing Retail Pilot Test
- **Jan-07**: Subordinate Specs, QA, & Recordkeeping
- **Feb-07**: Start Date
- **Mar-07**: New FR Line Introduction
- **Apr-07**: 1633 Mandatory Compliance - All Products
- **May-07**: Begin shipping floor samples for new FR line
- **Jun-07**:
- **Jul-07**:

**MANDATORY COMPLIANCE ALL PRODUCTS**

**START DATE**
16 CFR Part 1633 Requirements

- Prototypes
  - Qualified
  - Confirmed
  - Subordinate
- Quality Assurance Program
  - Inspections (Incoming, WIP & Finished Goods)
  - Production Lots
- Recordkeeping
  - Prototype Test Results
  - Prototype Records
  - Quality Assurance
16 CFR Part 1633 Requirements

- Labeling
  - Sold With Boxspring
  - Sold Without Boxspring (Mattress Only)
  - Sold With or Without Boxspring
16 CFR Part 1633
Implementation
16 CFR Part 1633 Implementation

- Product Line Analysis
- FR Systems Review
- FR System “Screen Testing” & Selection
- Qualify Prototypes
- Preparing for Production
  - Confirm Prototypes
  - Create Subordinate Prototypes
  - Quality Assurance Program
  - Recordkeeping
- Maintaining Compliance
Product Line Analysis
Product Line Analysis

• General Information
  – Retail Price Points by % of units sold
  – Mattress Type & Height by % of units sold
  – Boxspring Type & Height by % of units sold
• Mattress Specific
  – One or Two Sided (or both)
  – Constructions Offered
  – Core Unit: Innerspring, Foam Encased, Foam Core, Visco
• Boxspring Specific
  – Sewing Method
  – High or Low Profile
  – Unit
• Sets versus Mattress Only
Product Line Analysis

- Manufacturing Specific
  - Current processes and procedures
  - Current equipment and capacity (by department)
  - Current quality control procedures within each department and/or operation
- Purchasing Specific
  - Current suppliers
  - Supplier locations
- Future Considerations - Sales & Marketing
  - Top Panels
  - Borders
  - Bottom Panels
  - Boxspring
FR Systems Review
FR Systems Review

• How many FR systems do I need?
• How many FR systems can my factory handle?
• How will I differentiate the various FR systems within my factory?
• FR components selection criteria
  – Product Aesthetics
  – Supplier Capacity and Manufacturing Locations
  – Supplier QA and Component Certification
  – Cost
• Full Scale Sampling
  – Sales and Marketing Evaluation
  – Manufacturing Evaluation
  – Final Cost Impact
• Select possible FR solutions
FR Screen Testing & Selection
FR System “Screen” Test & Selection

- Produce identical twin size samples (2 each) for each possible FR system to compare FR performance
FR System “Screen” Test & Selection

• Test for 16 CFR Part 1633
  – Attend the burn
  – Document burn characteristics of various systems
  – Rate FR systems tested

• FR System Selection
  – Build additional samples (if required) for review
  – Review Sales, Marketing, Manufacturing & Purchasing aspects of each FR system
  – Select FR System(s) to Qualify
Consulting Groups / 3rd Party Prototype Developers
- Sampled and Qualified several FR component weights, blends and FR systems. Should be able to offer performance data on various FR systems.

Suppliers
- Usually have tested and Qualified their own FR System. Ask for test results.

Other Manufactures
- Review FR components and specifications used by manufacturers who might be willing to share their information and test results.
Qualified Prototypes

- **What is a “Qualified Prototype”?**
  - A Qualified Prototype is a representative sample of a mattress or mattress set introduced for sale in the U.S. that has passed the “burn test” a minimum of three consecutive times.
  - Each Qualified Prototype must be assigned a unique identification number.
  - Every mattress or mattress set sold in the U.S. must include the Qualified Prototype identification number on which the specification is based.
  - The regulation does not stipulate prototype requirements; the number of Qualified Prototypes is determined by the manufacturer.
Qualified Prototypes

– Smart prototyping is the single most important step in controlling cost during the compliance process.

• Too MANY prototypes = wasted time and high up front cost with no additional benefits.
• Too FEW prototypes = increased risk of non-compliance and perception of manufacturer’s intent to comply with the regulation.
What is a “Confirmed Prototype”? 

One manufacturer can “pool” Qualified Prototype specifications from another manufacturer, supplier or 3rd party as long as:

1. The manufacturer passes one confirmation burn of the pooled prototype. After passing the burn test, it is now referred to as a Confirmed Prototype.
2. The manufacturer maintains a copy of the prototype test records and the unique prototype identification number from the original manufacturer or supplier.

The manufacturer can now use the Confirmed Prototype specifications to introduce Subordinate Prototype specifications. Very beneficial and cost effective to companies who have multiple facilities and have implemented a “core” line where product specifications must be followed.
What is a “Subordinate Prototype”? 

– A Subordinate Prototype is a mattress or mattress set introduced for sale in the U.S. that is based on a Qualified or Confirmed Prototype and differs only in:
  • Size
  • Ticking
  • Components or materials shown not to degrade flammability performance

– Each Subordinate Prototype requires a record of the manufacturing specification and description of variation from the Qualified Prototype

– Each Subordinate Prototype requires documentation “based on reasonable criteria” that changes will not cause failure.
Qualify Prototypes

Super Pillow Top

Pillow Top

Ultra Cushion/Box Top

Euro Top

Tight Top

Smooth Top
Qualify Prototypes

- Taped Low Profile
- Continental Low Profile
- Taped High Profile
- Continental High Profile
- Bunkie Board
- No Boxspring – Mattress Only
- Wood Build Up
## Qualify Prototypes

### Realistic Product Line Offering (All Single Sided):

<table>
<thead>
<tr>
<th>Core Unit</th>
<th>Choice of Firmness</th>
<th>Panel Quilts</th>
<th>Boxsprings</th>
<th>Thickness Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innerspring</td>
<td>Tight Top</td>
<td>All Foam</td>
<td>Continental - Hi Pro</td>
<td>0&quot; - 20&quot;</td>
</tr>
<tr>
<td>Foam Encased</td>
<td>Pillow Top</td>
<td>Foam &amp; Fiber</td>
<td>Taped Hi Pro</td>
<td></td>
</tr>
<tr>
<td>Visco Core</td>
<td>Super Pillow Top</td>
<td></td>
<td>Continental - Lo Pro</td>
<td></td>
</tr>
<tr>
<td>Latex Core</td>
<td>Euro/Box Top</td>
<td></td>
<td>Taped - Lo Pro</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ultra Cushion Top</td>
<td></td>
<td>Wood Build Up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smooth Top</td>
<td></td>
<td>Bunkie Board</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No Boxspring</td>
<td></td>
</tr>
</tbody>
</table>

**Total Product Line Variations** 336
Determining Prototypes to Qualify

• Review Product Line Offerings & Options
  – Mattress Constructions
    • Tight Top, Pillow Top, Box Top Smooth Top, etc…
    • One Sided, Two Sided or Both
  – Boxspring Constructions
    • Taped, Inverted Seam, Continental
    • High & Low Profile, Wood Build Up, Bunkie, etc…
  – Quilt Specifications
    • FR Barrier Directly under Ticking
    • Sacrificial Layer above FR Barrier
  – Sold as mattress only or sets
• Determine “Worst Case” scenarios within Product Line
• Determine “Reasonable Criteria” for specs not tested
Possible Issues with Qualifying Prototypes

- Do not have a good understanding of 1633 requirements
- Have never witnessed a burn test and do not know how constructions affect FR performance
  - Overcompensate and test too many prototypes
  - Burn too few prototypes to reduce compliance costs
- Do not understand how to establish Reasonable Criteria for Subordinate Prototypes
Qualified Prototype Guidelines

• Testing Experience
  – Witnessed over 800 tests with Lilly Management Group
  – Witnessed over 500 tests at Serta Mattress Company

• Observations
  – Not all mattress constructions perform the same
  – Boxspring DO affect FR Performance of the set AND there is a difference between low profile, high profile, wood build up and bunkie board boxsprings
  – Handles, polyethylene edge supports and foam encasement can all affect FR performance of a mattress
  – Ticking Selection on Qualified Prototypes
Qualified Prototype Testing

• Items that influence results
  – The “gap” or “smile” between a mattress and boxspring will have a significant impact on the FR performance of a mattress set
  – Overlap of “continental border” can have an impact on FR performance of mattress set (especially two sided mattresses)
  – Mattress versus Boxspring finished size (Foam Encased)
  – Wrinkled or “saggy” borders
  – Borders that are too tight
Qualified Prototype Testing

• Items that *almost always* cause failures
  – FR component does not extend to all edges of panel and/or border
  – Operators use a “butt seam” when transitioning from one roll to another in the quilting operation
  – Thin spots or windows in FR component
  – FR Component is being “stretched” as it goes through quilter resulting in thin spots in finished panel and/or border
  – Failure to use FR Thread where specified
  – Border and panel not caught in tape line
Where can I get Qualified Prototypes?

- **Consulting Groups / 3rd Party Prototype Developers**
  - Qualified several FR component weights, blends and FR systems.

- **Suppliers**
  - May have Qualified their own FR System. Ask for test results.

- **Other Manufactures**
  - Review FR components and specifications used by manufacturers who might be willing to share their information and test results.
Pooling Qualified Prototypes – What to ask for

- Prototype Specifications
  - Mattress & Boxspring constructions and combinations
  - Methods of Construction
  - Non FR component specifications
- Unique Qualified Prototype Identification Numbers
- Qualified Prototype Test Results & Video/Pictures
- REASONABLE CRITERIA
  - Changes in construction, raw materials and/or methods
  - 90% of Subordinates will be through Reasonable Criteria
Reasonable Criteria – Are these covered?

- Qualified Prototype
  - Tight Top, 6” Foam (1.2#), 9” Continental Boxspring
- Subordinate #1
  - Pillow Top, 6” Foam (1.2#), 9” Continental Boxspring
- No, Pillow Top constructions burn differently than Tight Tops. Must have additional testing.
- Subordinate #2
  - Tight Top, 4” Foam (1.2#), 9” Continental
- Yes. Same construction, same boxspring, less foam.
- Subordinate #3
  - Tight Top, 6” Foam (1.2#), 5.5” Continental
- No. Need testing to demonstrate 5.5” boxspring will not effect FR performance of set.
- Subordinate #4
  - Euro Top, 6” Foam (1.2#), 9” Continental
- No. Different mattress construction. Must have additional testing.
Reasonable Criteria – Are these covered?

• Qualified Prototype
  – Tight Top, 6” Foam (1.2#), 9” Continental Boxspring
• Subordinate #5
  – Tight Top, 6” Foam (1.2 #), 9” Taped Boxspring
• No. Taped Boxsprings will perform differently than Continental Boxsprings. Must have additional testing.
• Subordinate #6
  – Tight Top Foam Encased, 4” Foam (1.2#), 9” Continental
• No. Different mattress construction.
• Subordinate #7
  – Tight Top, 6” Foam (1.5#), 9” Continental
• Maybe. Must have test data to support difference between 1.5# and 1.2# foam.
• Subordinate #8
  – Tight Top, 6” Foam (1.0#), 9” Continental
• Maybe. Must have test data to support difference between 1.0# and 1.2# foam.
Prepare for Production
Prepare for Production

• Confirm Prototypes (If using prototype pooling)
• Create Subordinate Prototypes
  – 90% of products inspected will subordinate specifications
  – Reasonable Criteria and “backup” test results are essential
• Quality Assurance Program
• Recordkeeping
• Labeling Requirements & System Changes
  – Permanent Label
  – Production Lots
  – Qualified, Confirmed & Subordinate Prototypes by Production Lot Lot Number
• Manufacturing Considerations
  – FR Effect on Manpower Requirements
  – Equipment
Maintaining Compliance
Maintaining Compliance

- FR Training Program
  - Supervisors & Operators understanding of program
    - Video – Non FR Test
    - Video – FR Test
    - Video – Manufacturing Defects and effects on test results
  - Inspectors/QA
- Work In Process Inspection Program
- Final Inspection Program (what to look for)
- Finished Goods
  - Teardowns
  - Random Testing
- Third Party Audits
Resources for help
Resources for help

- Consultant Groups
- FR Component Suppliers
- FR Testing Laboratories
- ISPA
- CPSC - Interpretation of Regulation
- Sleep Products Safety Council
Questions?