

CPSC Mattress Seminar

Prototyping

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February 16, 2006

- On February 16, 2006 the Consumer Products Safety Commission gave final approval to the new federal open-flame standard called 16 CFR Part 1633.
- 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.



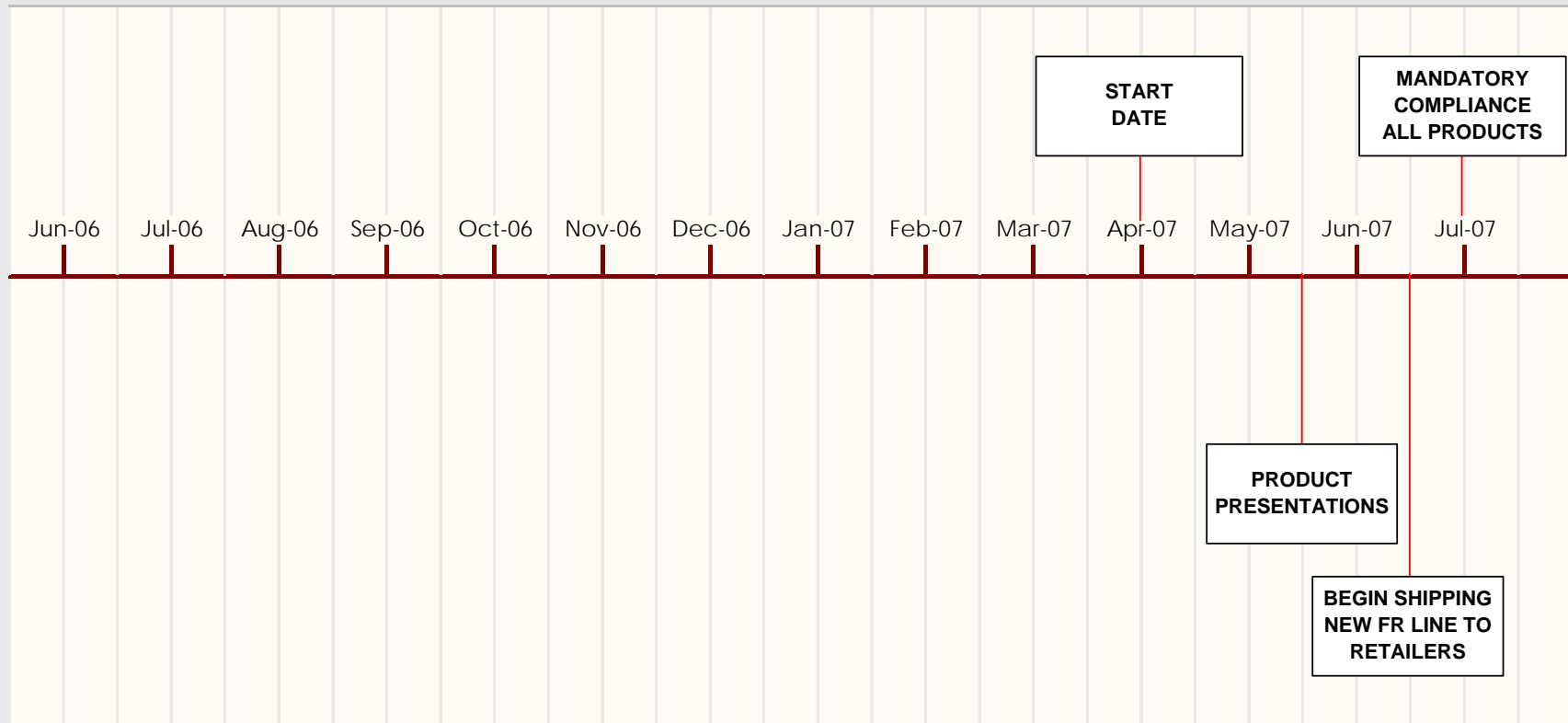
Starting the Compliance Process

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?

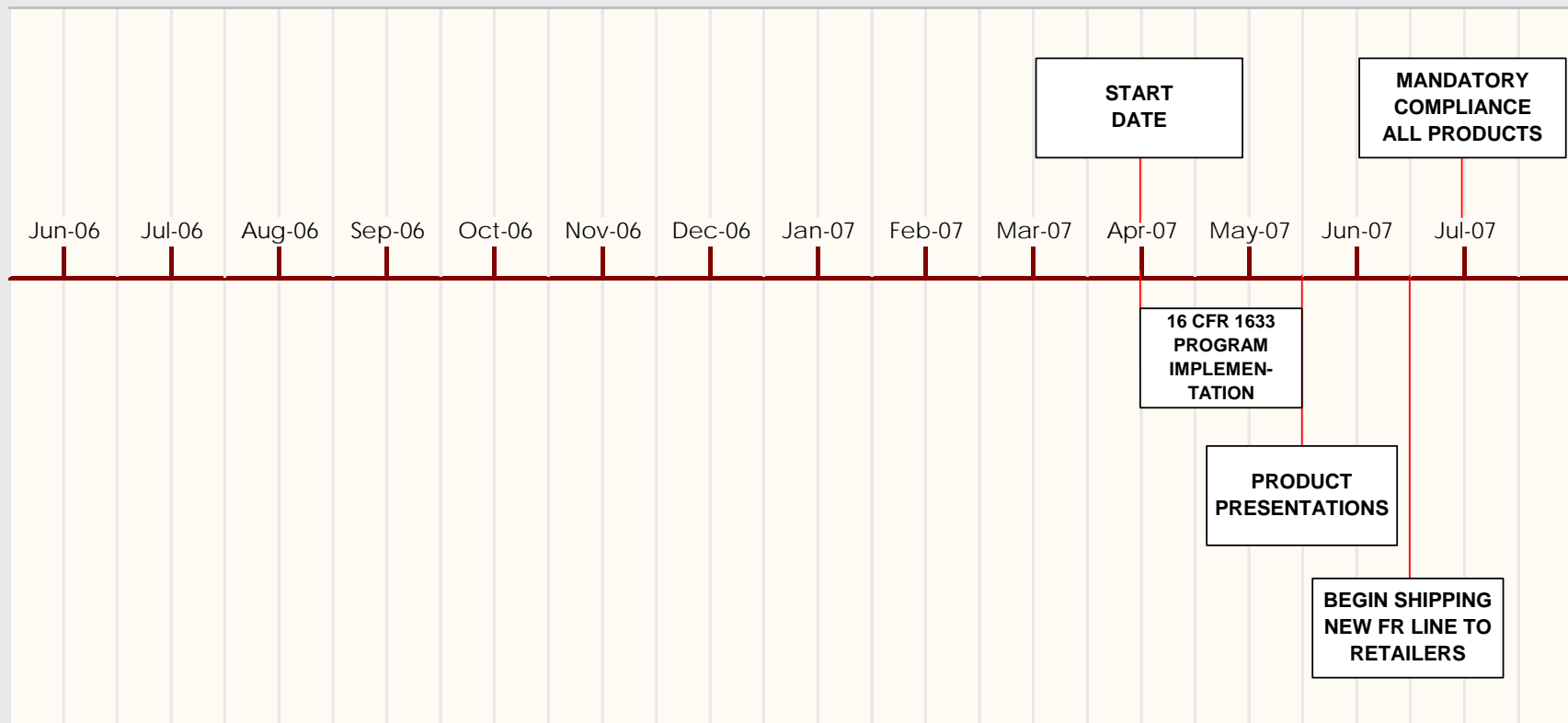
Timeline for Implementation

1633 Timeline to Meet Compliance Date



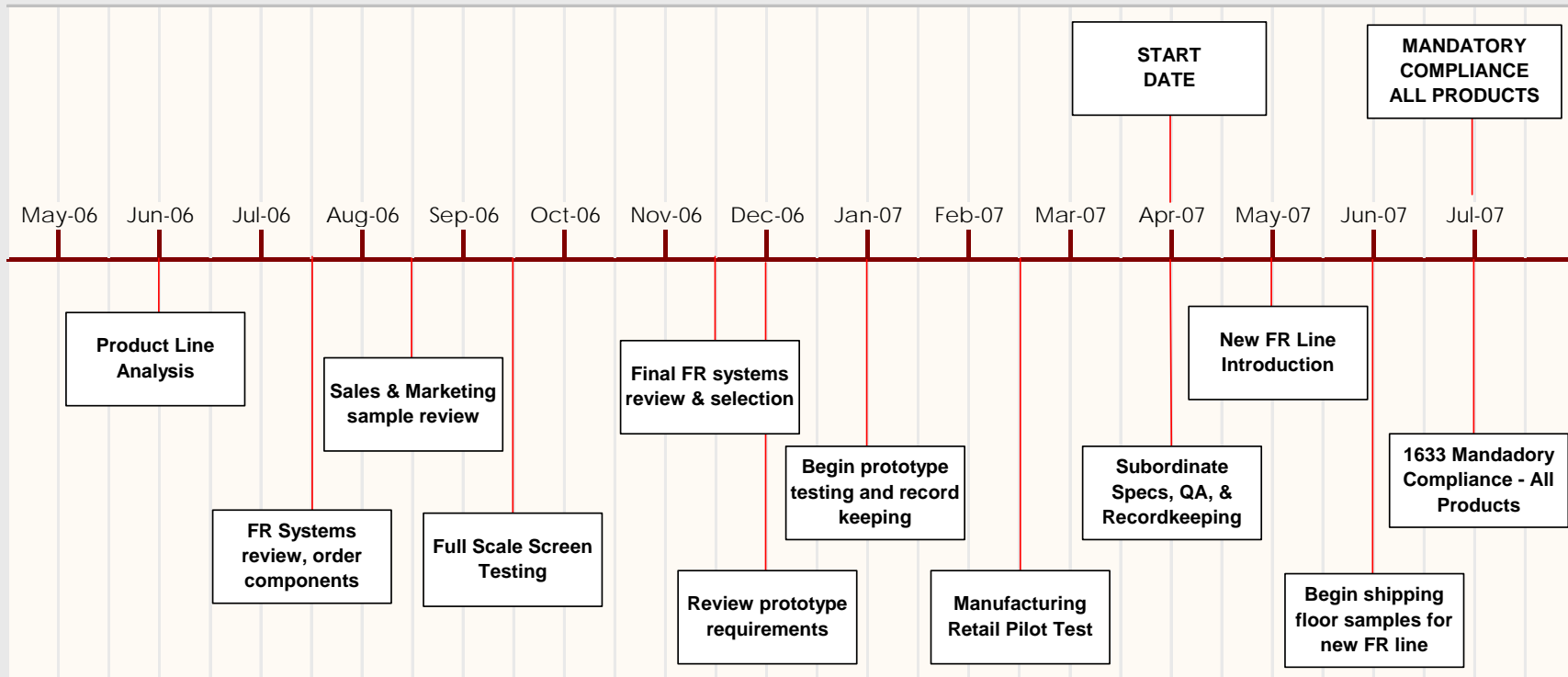
Timeline for Implementation

1633 Timeline to Meet Compliance Date



Timeline – Strategic Approach

1633 Timeline to Meet Compliance 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

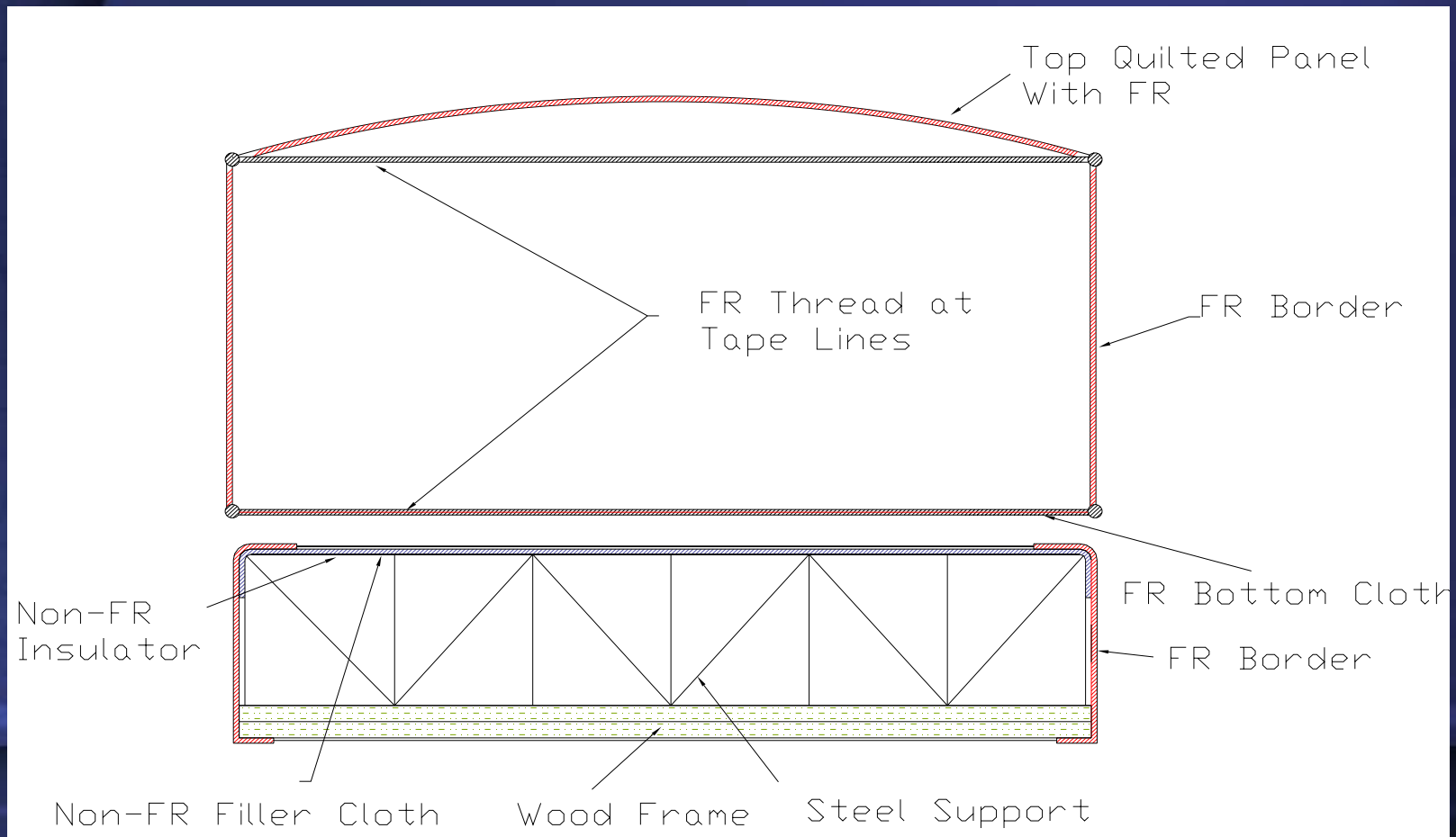
- How many FR systems do I need?
- How many FR systems can my factory handle?
- How will I differentiate the various FR systems within my factory?
- FR components selection criteria
 - Product Aesthetics
 - Supplier Capacity and Manufacturing Locations
 - Supplier QA and Component Certification
 - Cost
- 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

Assistance in Selecting FR System without Testing

- ***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.

Qualify Prototypes

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.

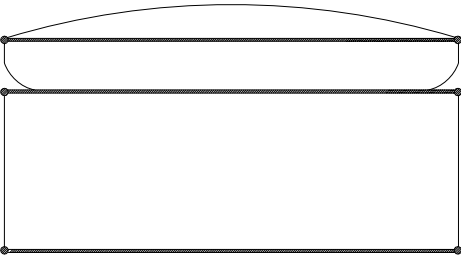
Confirmed Prototypes & Prototype Pooling

- *What is a “Confirmed Prototype”?*
 - One manufacturer can “pool” Qualified Prototype specifications from another manufacturer, supplier or 3rd party as long as:
 - The manufacturer passes one confirmation burn of the pooled prototype. After passing the burn test, it is now referred to as a **Confirmed Prototype**.
 - 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.

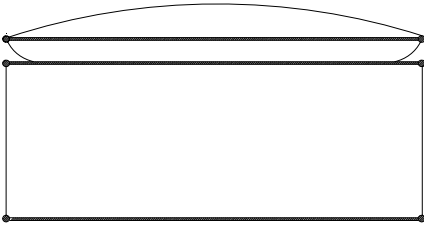
Subordinate Prototypes

- *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.

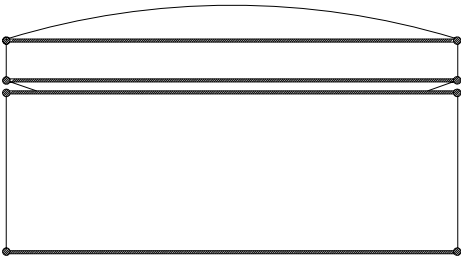
Qualify Prototypes



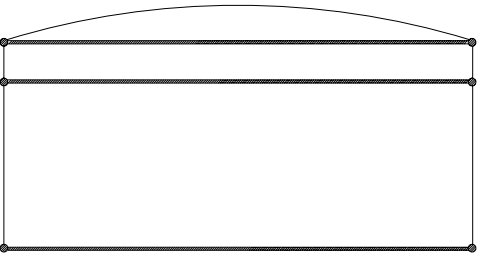
Super Pillow Top



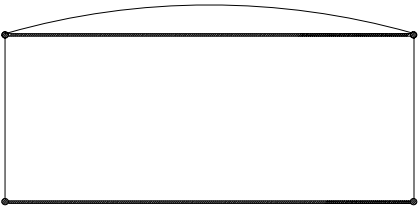
Pillow Top



Ultra Cushion/Box Top



Euro Top

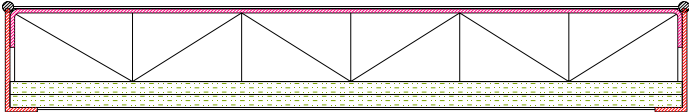


Tight Top

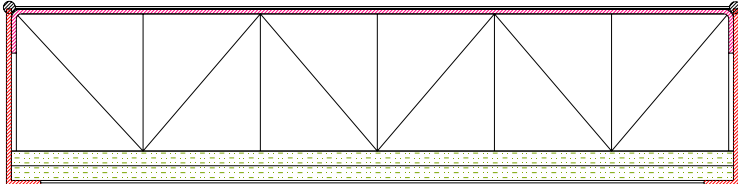


Smooth Top

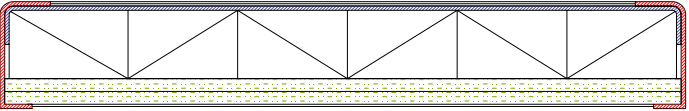
Qualify Prototypes



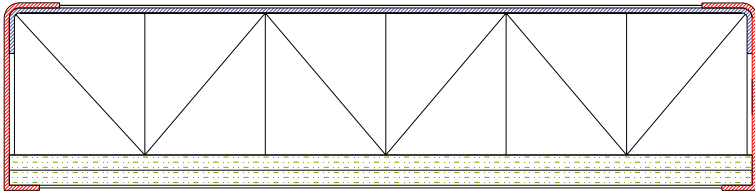
Taped Low Profile



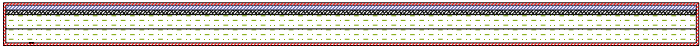
Taped High Profile



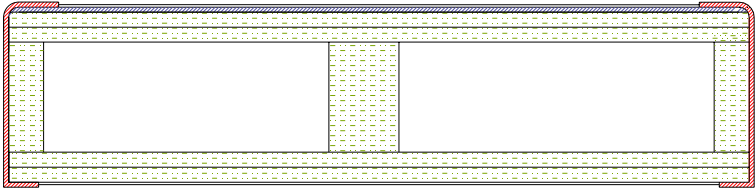
Continental Low Profile



Continental High Profile



Bunkie Board



Wood Build Up

No Boxspring – Mattress Only

Qualify Prototypes

Realistic Product Line Offering (All Single Sided):

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

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 effect FR performance
 - Over compensate 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.**

The background is a dark blue gradient with several overlapping, semi-transparent shapes. On the left side, there is a grid pattern. The overall aesthetic is modern and professional.

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 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?