



Lead Free Invasion....

RoHS Transition Plan

Updated November 2005

Outline



- Background Information
- Conversion Objectives/Timeline
- Conversion Strategy

RoHS Impact to Tyco Electronics



- For the majority of TE products, **RoHS Compliance** involves removing the restricted materials in the following areas:
 - Tin/lead plating on metal contacts is the primary source non-RoHS compliance
 - Hex Chrome used in finish applications (e.g. connector shells, hardware) and replaced with Tri Chromium (Cr+3) in most applications
 - Pb & Cd as plastic colorant already removed
 - PBB & PBDE as flame retardant already removed
 - No mercury used in TE products
- In addition; some products may require higher temperature materials (e.g. plastic connector housings) to be **RoHS Compatible** (lead-free process capable at 245C or 260C)
- Conversion to **RoHS Compliance** for other products such as cables or PCBs may also require:
 - Conversion to lead free solder process
 - RoHS compatible components (e.g. connectors, cable/jackets)

Background Information



- Tyco Electronics has assessed and coded over 1.5MM end items/components for RoHS Compliance
 - Assessed/coded for RoHS compliance (no restricted materials)
 - Assessed/coded for Lead Free process capability where applicable
- New part numbers have been issued where any change was required to bring product into RoHS compliance (some specific exceptions exist)
 - Cross-references between non-compliant and compliant parts
- Systems developed to disseminate information to customer
 - E-Catalog/E-Commerce sites with compliance/x-ref information
 - Website with technical reports/test data made available
- Suppliers and processes have been qualified
 - Tin plating baths qualified to iNEMI tests as appropriate
 - Substitutes for hex chrome evaluated and implemented
- Compliant product is being labeled as RoHS (or ELV) compliant

Background on Lead Free Plating



➤ In most cases, current tin-lead plating will convert to pure tin

- Tin performs similarly to tin-lead in electrical properties, joint reliability, and is compatible with both tin-lead and lead free assembly processes
- However; with pure tin plating there is a minimal possibility of tin whisker formation. This possibility of tin whisker formation is not unique to Tyco Electronics, but is a phenomena of tin plating and pervades the electronics industry
- For certain applications where any possible whisker formation must be avoided (e.g. safety related products), TE recommends alternative lead free platings, such as gold flash, which have no possibility of whisker formation

➤ Tyco Electronics is a leader in tin plating technology

- Based on the results of extensive research and testing, Tyco Electronics has implemented processes and techniques which significantly minimize the formation of whiskers in tin plating
- Conducted testing on over 150 tin plating chemistries (and mitigation techniques)
- Active participant in industry efforts to develop standard tests of plating chemistries (iNEMI & JEDEC) and have qualified internal and supplier plating processes to these specifications

Product Availability & Plans



- Most products across TE product portfolio are available to order in RoHS compliant version currently
 - Many RoHS connector products shipping in production quantities
 - Switches/relays available with some exceptions
 - Cables are being addressed on demand basis – general availability will be December 2005.
 - Plan for all products to be available in RoHS version by end CY2005
- Tyco Electronics Strategy is to convert all products to RoHS compliant versions with following exceptions:
 - Products specific to Mil-Aero and other exempt industries (Medical)
 - Dual versions of compliant pin connectors (pressfit) will be provided (SnPb plated and tin plated)
 - Products that are suitable for use in applications covered by lead in solder exemption (5 of 6 compliance) will continue to be provided along with the fully RoHS compliant (leadfree) version
 - Dual versions of BGA devices will continue to be provided

Conversion Objectives

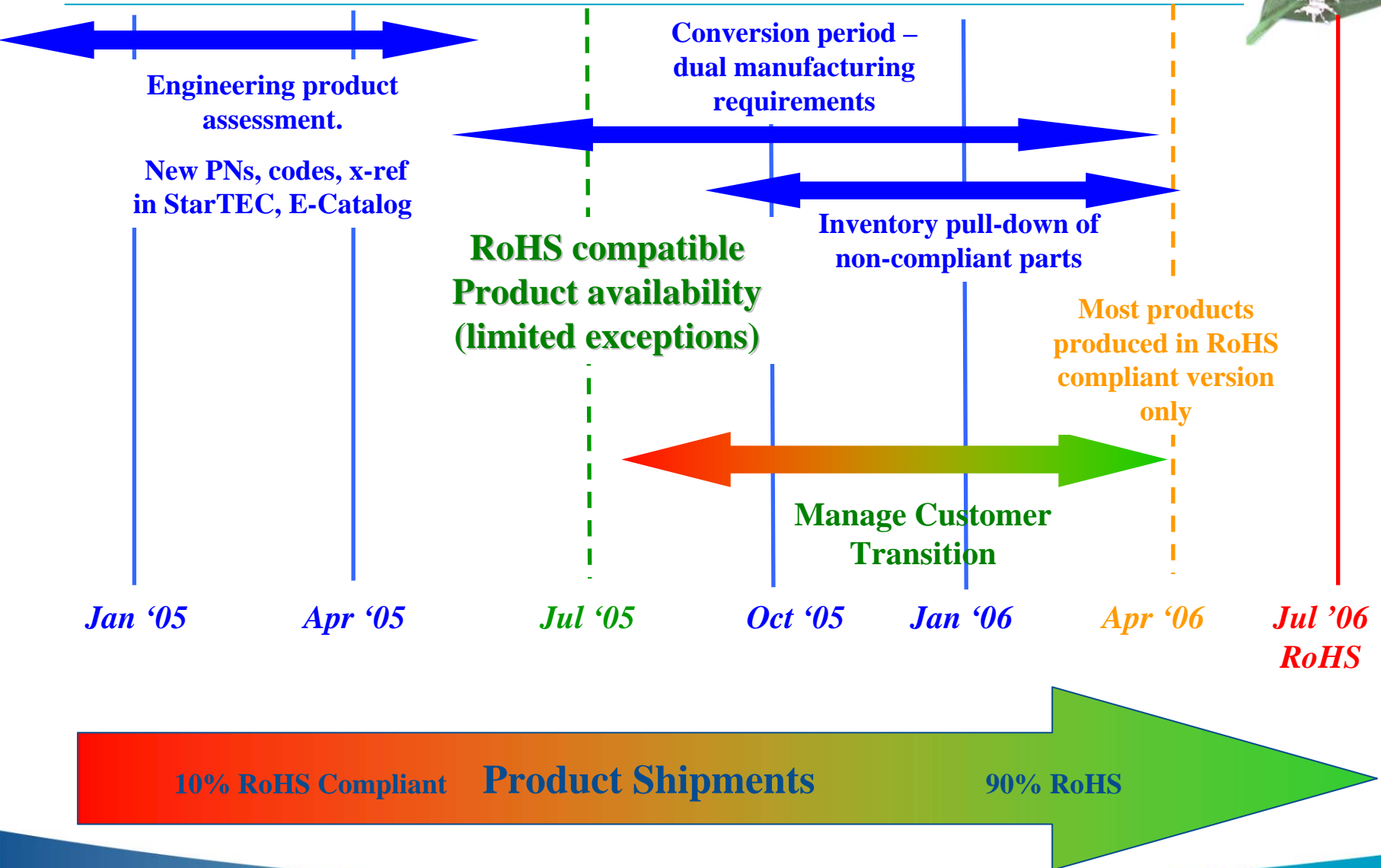


- Match TE RoHS transition to compliant products w/ customer timeframes as much as feasible
- Continue to provide non-compliant (current) product where customer required/desired
- Provide uninterrupted product flow to customers

However; we need to satisfy these objectives while

- Reducing inventory of non-compliant product throughout supply chain
- Reducing time in dual manufacturing environment which impacts cost/lead-times

Overall TE Timeline (component products)



Conversion Strategy



- Proactively encourage migration to compliant products
 - Provide customers with part x-refs of current part to compliant part
 - Provide info on product availability (lead-times, etc.). It is TE intention to make RoHS product availability/status similar to non-compliant part being replaced
 - **It is important to note that most TE RoHS products (BGAs are exception) are “backward compatible”. They can be used in customer’s current tin-lead process without modification**
 - **Performance of compliant products are equivalent to non-compliant products being converted**
- As manufacturing transitions to RoHS compliant products, the following actions may be taken:
 - On a part by part basis, non-compliant product may be moved to Make-to-Order, non-cancelable, non-returnable status
 - After November 1, 2005 TE will accept no returns of non-compliant product – note this does not apply to products for exempt industries
 - Migrate backlog to compliant products – remaining non-compliant backlog may become non-cancelable/non-returnable after January 1, 2006

Conversion Strategy – Cont'd



- PCNs will be used to indicate product transition timing and status changes
 - Opportunity for continued purchases of non-compliant product under new part status (non-cancelable, non-returnable)
 - PCNs and transition timing will be consolidated where feasible
 - Customers will be consulted before converting backlog to compliant product by year end 2005.

- Tyco Electronics objective is to be largely complete with our conversion to RoHS compliant manufacturing by April 1, 2006 with exceptions as noted previously

Keys to Successful Transition



- Regular/detailed communication between TE and customers on:
 - Products impacted
 - TE product transition/timing at part number level
 - Customers conversion plans and timing
- Flexibility of customers to:
 - Approve of use of compliant parts on non-RoHS programs – either not yet converted or outside scope of RoHS
 - Staggered phase in of compliant parts – except where driven by customer shift to RoHS compliant manufacturing

Bottom line – We need your cooperation in making this transition a win-win proposition

Additional Information



- Electronic Catalog w/ RoHS/LF part info: [E-catalog](#)
- Tyco Electronics Lead Free Web Site: [LF Web Site](#)
- Technical Data: [LF Tech Data](#) . Includes information on
 - Solderability of lead free finishes
 - Tin Whisker Reports and Mitigation Techniques
 - Resistance to Solder Heat
 - Contact Resistance Testing
 - Lead free Press-fit connections
 - Friction of Tin plated products