


Fab Productivity



# **300 mm Equipment Software Conformance Testing Project**

**Steve Fulton**

**[steve.fulton@sematech.org](mailto:steve.fulton@sematech.org)**

**(512) 356-3611**

INTERNATIONAL  
**SEMATECH**

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# Project Objectives

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**Accelerate:** THE MATURITY AND AVAILABILITY OF EQUIPMENT INTEGRATION AND AUTOMATION SOFTWARE

**Assess:** THE CURRENT STATE OF THE INDUSTRY FOR 300 MM STANDARDS CONFORMANCE

**Assist:** THE SUPPLIER IN STANDARDS IMPLEMENTATION AND PROBLEM RESOLUTION THROUGH INTERACTIVE DISCUSSION AND EXPERT GUIDANCE

# Success!

# Topics

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- **Conformance Test Results**
- **Successes – What worked well**
- **Opportunities – Could have worked better**
- **Lessons Learned**
- **Next Steps**

# Software Conformance Test Project

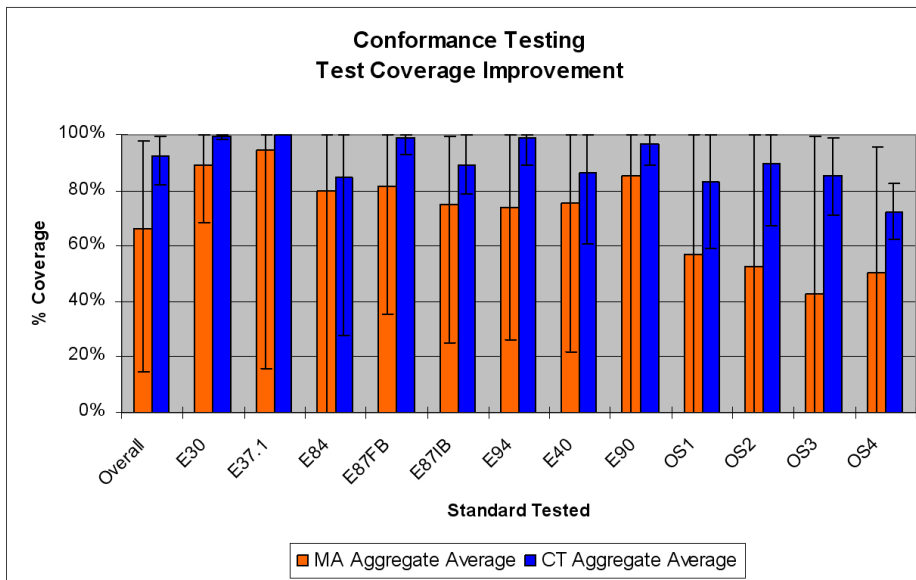
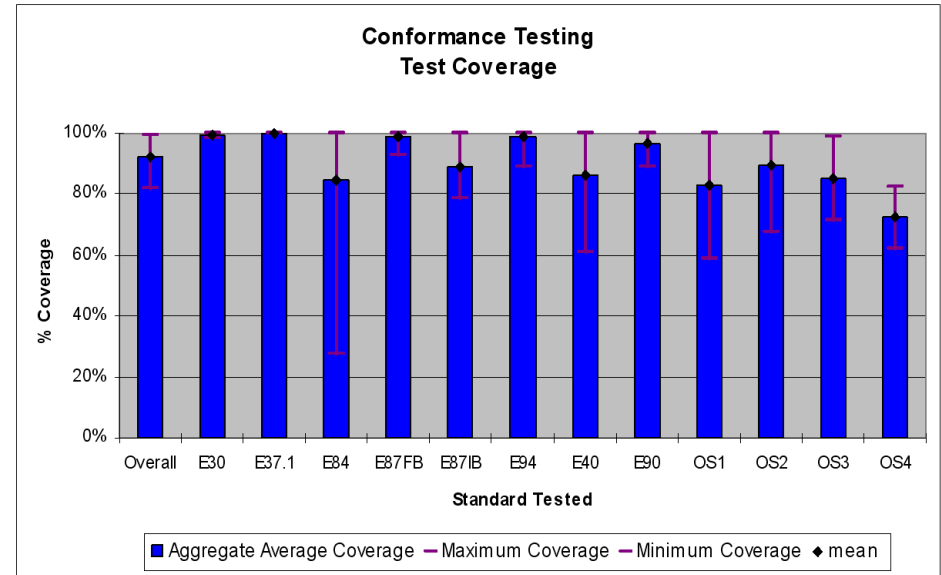
- **39 suppliers/equipment participated actively in the project**
- **21 completed the cycle for conformance testing**
- **Project was based upon a test  $\Rightarrow$  improve  $\Rightarrow$  re-test model**
- **Focus capabilities for the project were the basic functions and operational scenarios defined in SEMI standards and ISMT Operational Scenarios – for a static operating mode (single FOUP/Carrier/batch, sequential processing)**

# Test Coverage

Test coverage establishes that a test will produce valid and representative results

High levels of test coverage have become the norm (>90%)

Operational Scenario testing noticeably under performs other sessions and requirements areas



Distribution of results has tightened up a lot – more consistency between tests

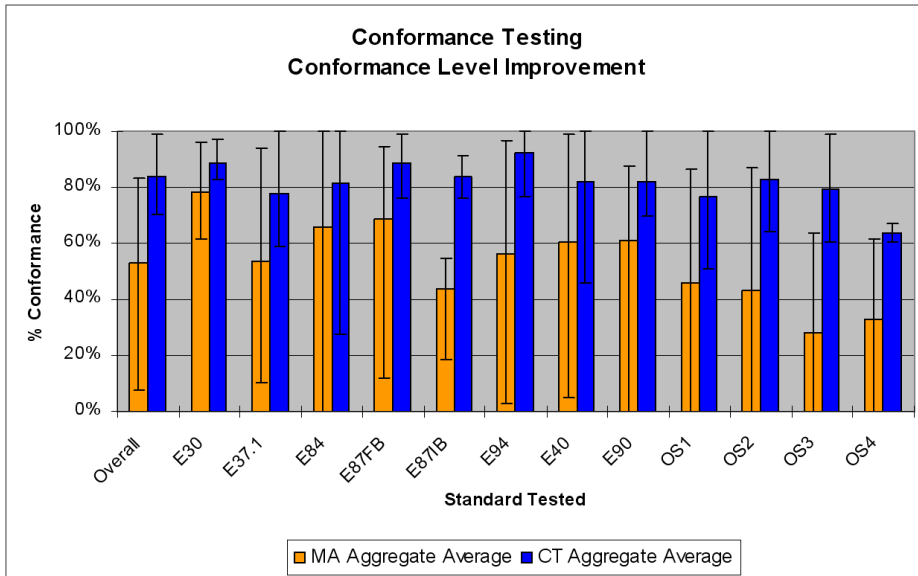
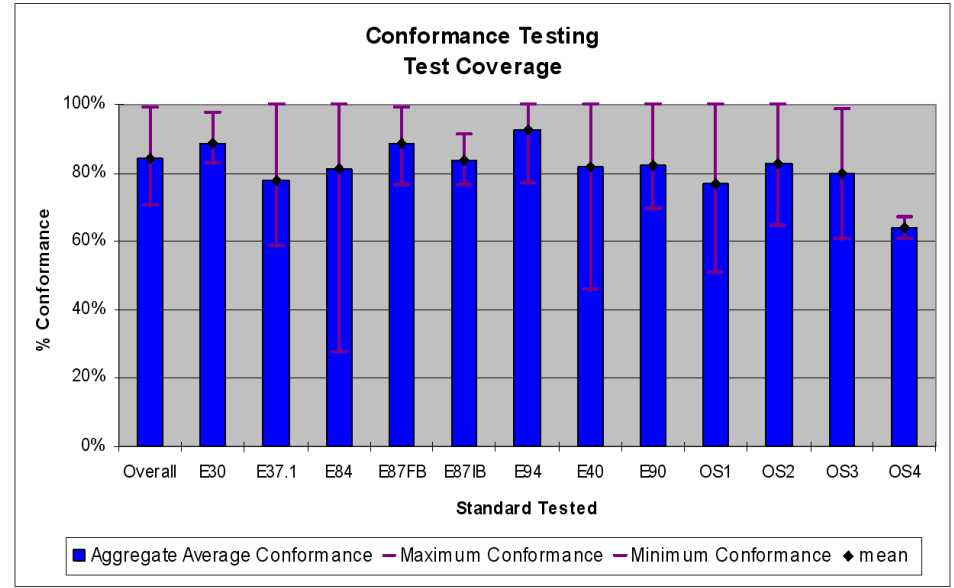
Improvement from the Maturity Assessment testing to the Conformance testing averages in the 30% range

# Conformance Level

Test results show a reasonably high implementation and performance level

There is a surprising weakness in the HSMS and Parallel I/O communication area

Although Operational Scenario results still trail, there are signs of performance parity indicating a maturing of the software



Average Conformance level improved from 52% to 84%

In the MA test, the variation in conformance levels was in the 80% range

Job management and internal buffer performance is markedly improved

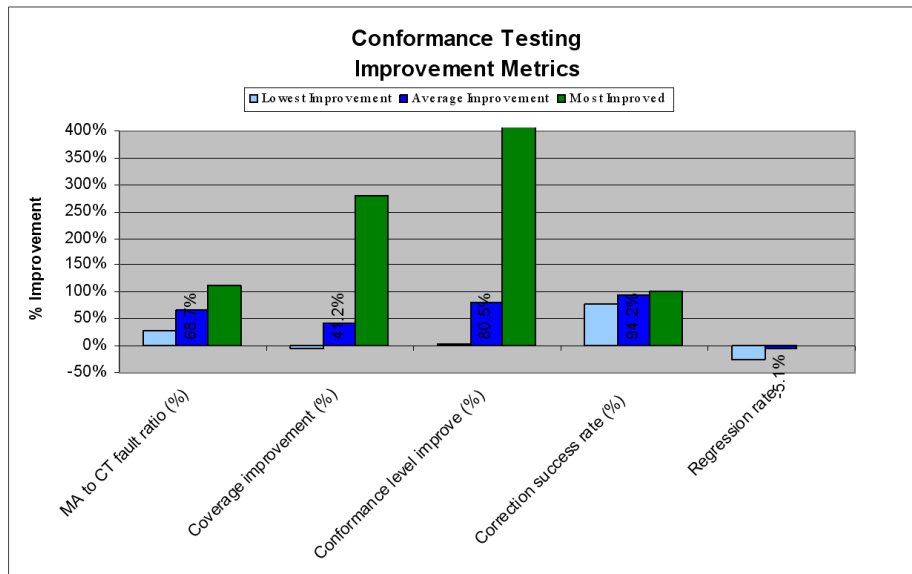
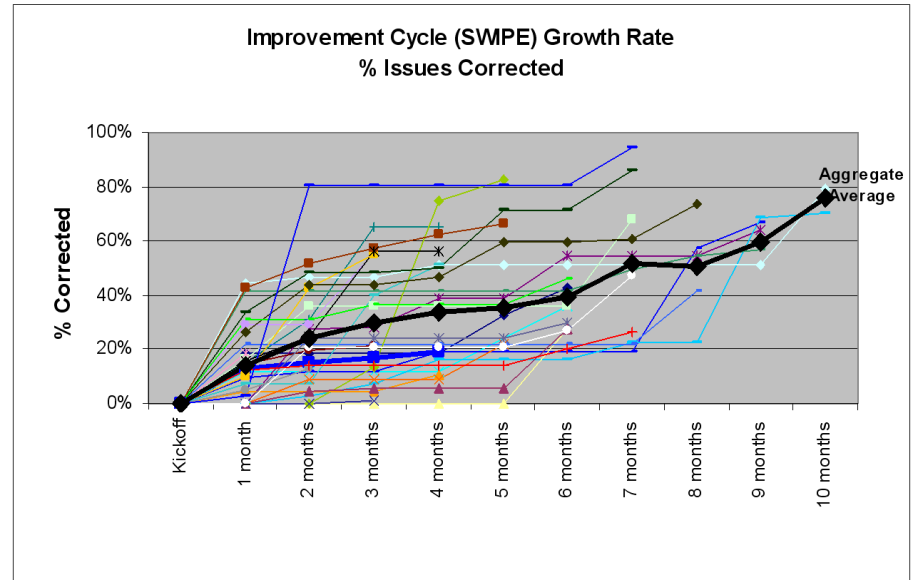
# Improvement

Aggregate Average Growth rate estimate is 7.2% per month

Wide variation in the rate and result that a supplier can achieve

Physical/mechanical designs limit some requirements

Actual Conformance Test results find that it produces approximately a 12% per month improvement effect



Identified errors rate was reduced as expected, real growth

Average conformance improvement = >80%

Correction success rate, 94%

Regression rate averaged 5%, with a worst case of 23%

## The good...

**Working together in an open discussion forum – everyone had the same goal**

**Consensus requirements – the common needs from the fab point of view**

**Having a commercial test product available to everyone**

**Following objective criteria and methods (no customization for tool type)**

**Feedback to 3<sup>rd</sup> Party software, service, and test providers**

**Identified conflicts and errors in the standards, allowing corrective action**

**Metrics quantify current performance, and allow evaluation of maturity and strategic positioning**

## The bad...

**Industry business conditions caused huge challenges, especially to equipment availability and schedule**

**Resource availability – everyone had a difficult time finding people and time to execute the project**

**The commercial tester required improvement and maturity**

**Establishing an environment that protected early data and improvement activities – isolating it from marketing impacts**

**The complete lack of industry infrastructure to pull the needed elements together to execute this initiative – much more extensive than we had foreseen**

**A wider participation from the supplier base was desired**

**Software has not yet been validated as a core component to advanced equipment, so it remains under specified and resourced, and the economic model remains unclear**

## Key lessons learned

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**The only sure way to succeed is to work together closely. There are too many opportunities for misunderstanding and miscommunication with these complex requirements, and no one point of view considers all needs.**

**Consolidation of requirements provides huge efficiencies at all levels. The consensus on common requirements was a significant proof of this**

**We have made a good first step, the challenge is to continue**

## Next Steps

While improvement continues in basic static requirements, we must tackle the urgent needs of High Volume Manufacturing and dynamic operational environments – **Launch a new project**

There is a need for independent test resources for the industry – **ISMT will be trying to drive the established test method into industry as a “Best Practice” so there is an interim source while investigation and development continue on certification**

Maintain open communications and discussions to our mutual benefit – **Discussion forums such as SIS and this workshop are critical to continued mutual improvement**