



# Automating the Quality Control of Fragrances

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Seven



# Overview

- Who are Seven?
- Drivers for change
- Decision process
- Scope and Implementation
- System
- Evolution
- Results
- The Future



# Who Are Seven?



*“If we were to start with a blank sheet of paper and figure out what to do, if we weren’t afraid of failing, what is the most audacious thing we would try?”*

*Seth Godin - Purple Cow: Transform Your Business by Being Remarkable*



# Who Are Seven?



- Principal activities
  - Creation & development of fragrances.
  - Procurement of fragrance raw materials.
  - Compounding of finished fragrances.
  - Distribution of fragrances globally.

Sending out 150te of finished fragrance per month worldwide



# Worldwide Customer Base





# Drivers for Change

*“To create a quality management system that is robust, secure and auditable.....”*

Alistair Wilding Technical Manager - Seven Quality objectives 2008/09

- System in place was unreliable and without support
  - No traceability
  
- Alternatives
  - LIMS
    - Expensive, unnecessary
  - Statistical packages
    - Limited ability to store chromatography
      - Had good trending capabilities



# Decision Process

- Stripped concept
  - Reduced requirements to fundamentals
    - Required database to capture Chromatography with the rest of the data
- Concept rebuilt
  - Required functionality re-introduced
- Reviewed available options
  - Potential could be seen in the ACDLabs package



# Scope

- Multiple forms of testing
  - GC, RI/Den/SG, FTIR, Olfactive
  - Physical Properties
    - Mobile liquid, Non-volatile, Solid
- Sample Types
  - Finished Products, Raw Materials, Potential Purchases
    - Different output requirements
- Integration with other systems
- Trend Analysis
- Electronic Sign-off





# Integration

- Data from each piece of analytical equipment
  - GC Chromatography
  - FTIR Spectra
  - RI/Den/SG .csv file
- Integration with WMS (Marco) system
  - Lot information
  - Approve / Quarantine / Reject

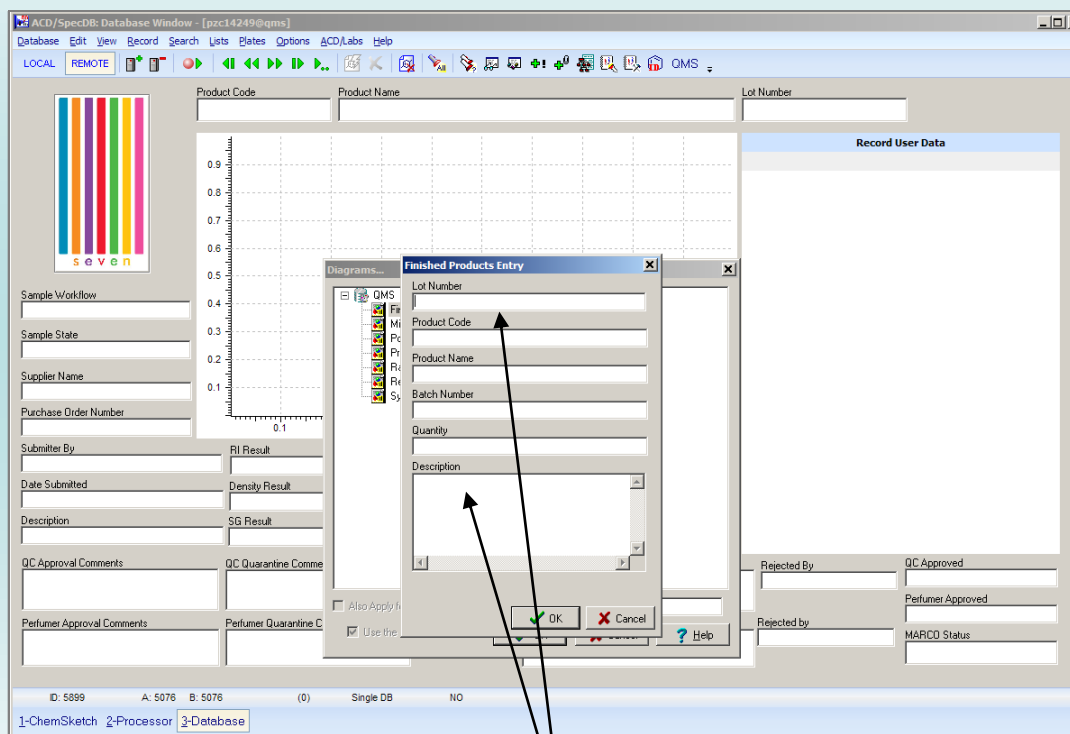


# Implementation

- Workflows established
  - Each sample type
- Functionality added
  - System integrated with WMS test server
- Plenty of Beta testing – Project Creep
  - Forms and reports designed
  - Security profiles implemented



# Sample Entry



New records require binding to a chosen workflow, dependant on sample type



# Sample Entry

The screenshot shows a software interface for 'Finished Products Entry'. The main window has a menu bar (Database, Edit, View, Record, Search, Lists, Plates, Options, ACD/Labs, Help) and a toolbar. The main area contains a grid for data entry and a 'Record User Data' section. A dialog box titled 'Finished Products Entry' is open, showing the following fields:

- Lot Number
- Product Code
- Product Name
- Batch Number
- Quantity
- Description

At the bottom of the dialog box, there are checkboxes for 'Also Apply to' and 'Use the', and buttons for 'OK', 'Cancel', and 'Help'. The status bar at the bottom of the main window shows 'ID: 5899 A: 5076 B: 5076 (0) Single DB NO' and a tab for '1-ChemSketch 2-Processor 3-Database'.

The Lot number and Description are mandatory for raw materials and finished products  
The rest of the data is retrieved from the WMS system



# The System

Unique product code

Unique Lot number

Spectra /  
Chromatography  
window

The screenshot displays the ACD/SpecDB: Database window for product TOP SOAP 12-L-93, Lot Number 51649. The interface includes a menu bar (Database, Edit, View, Record, Search, Lists, Plates, Options, ACD/Labs, Help), a toolbar, and a main data area. The data area is divided into several sections: Product Codes (0791-1008-0), Product Name (TOP SOAP 12-L-93), Lot Number (51649), Record User Data (Product Name, PROJECT, FLOWCHART, STATE, Product Code, Lot Number, Total Quantity, Description, Date Submitted, Submitter Name, Submitter Username, Submitter eMail, RI Value, Density Value, SG Value, Reference RI Value, Reference Density Value, Reference SG Value, RI/D/SG Data Added Date, FTIR HQI Value, FTIR HQI Result), RI Result (Pass), Density Result (Pass), FTIR HQI Value (0.9995), GC HQI Value (0.5797), FTIR HQI Result (Pass), and a table for QC Approval, QC Quarantine, and QC Rejection comments. The bottom status bar shows ID 5382, A: 5075, B: 5075, GC (2), Single DB, NO, and navigation buttons for 1-ChemSketch, 2-Processor, and 3-Database.

RI/Den/SG Results

Record information

FTIR HQI results

Comments

Electronic Sign-off



# The System

Purchase order  
and supplier info



ACD/SpecDB: Database Window - [pzc14249@qms]

Database Edit View Record Search Lists Plates Options ACD/Labs Help

LOCAL REMOTE

Product Code: 0920-3083-1 Product Name: HEXYL CINNAMIC ALDEHYDE Lot Number: 51640

Record User Data

Product Name: HEXYL CINNAMIC ALDEHYDE  
PROJECT: QMS  
FLOWCHART: Raw Materials  
STATE: Raw Materials Logged Out  
Product Code: 0920-3083-1  
Lot Number: 51640  
Supplier Name: WHYTE CHEMICALS LTD  
Purchase Order Number: 16626  
Total Quantity: 1900  
Description: pale yellow mob liq  
Date Submitted: 03/06/2010 14:40:27  
Submitter Name: Clare Paddison  
Submitter Username: PZC15497  
Submitter eMail: Clare.Paddison@sevencent.co.uk  
RI Value: 1.54753  
Density Value: 0.95488  
SG Value: 0.9566  
Reference RI Value: 1.550  
Reference Density Value: 0.954  
Reference SG Value: 0.956  
RI/D/SG Data Added Date: 03/06/2010 15:56:59

Sample Workflow  
Raw Materials  
Sample State  
Raw Materials Logged Out  
Supplier Name  
WHYTE CHEMICALS LTD  
Purchase Order Number  
16626  
Submitter By  
Clare Paddison  
Date Submitted  
03/06/2010 14:40:27  
Description  
pale yellow mob liq

RI Result  
Pass  
Density Result  
Pass  
SG Result  
Pass

Document User Data  
Original File Name: C:\QMS\Processed\51640\51640.ABS  
FTIR HQI Value  
0.9388  
GC HQI Value  
0.4420  
FTIR HQI Result  
Pass

QC Approval Comments  
QC Quarantine Comments  
Quarantined By  
QC Rejection Comments  
Rejected By  
QC Approved  
PZC16548  
Perfumer Approved  
PZC14227  
MARCO Status  
Approved

Perfumer Approval Comments  
new ref urgent  
Perfumer Quarantine Comments  
Perfumer Rejection Comments  
Rejected by

ID: 5871 A: 5075 B: 5075 UVIR (2) Single DB NO

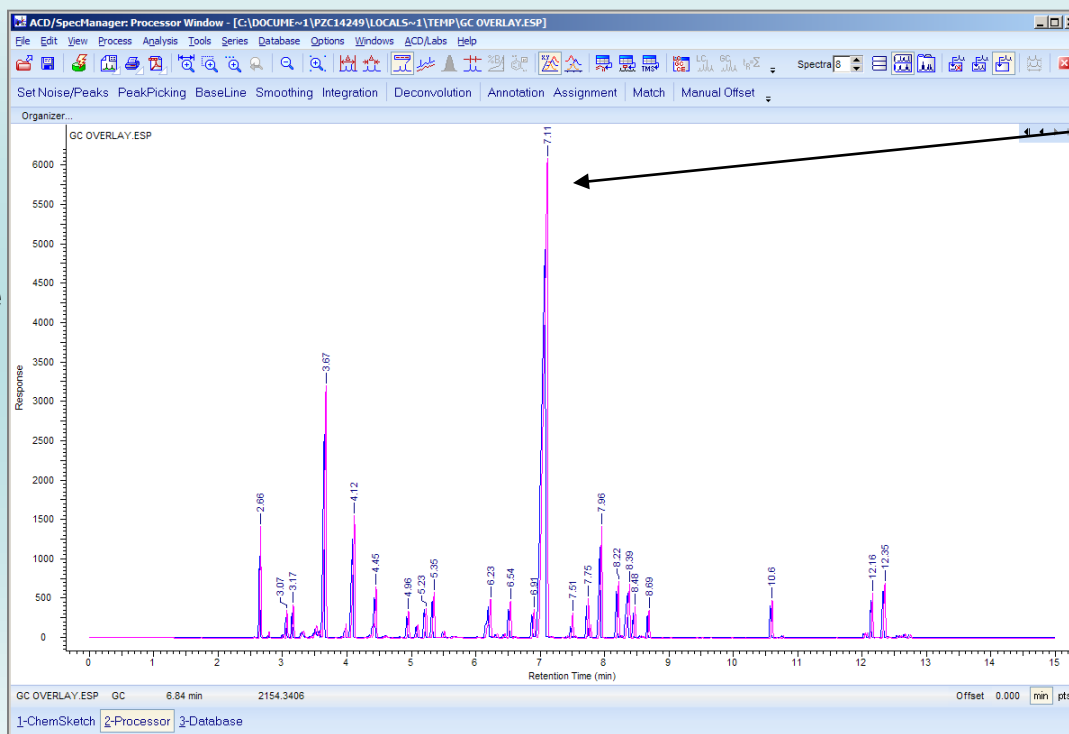
1-ChemSketch 2-Processor 3-Database

More information available from WMS for raw materials



# GC analysis

Differences seen show  
variance in GC  
Conditions and sample  
preparation



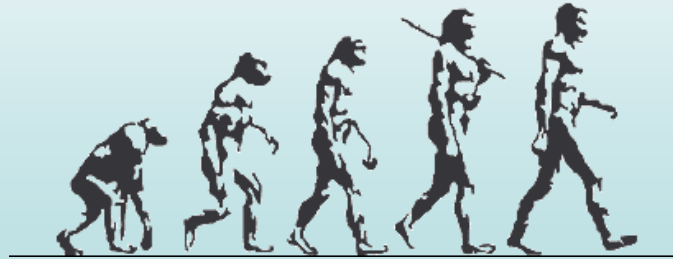
Pink is the reference  
chromatography

Blue is the sample  
chromatography

Reference data retrieved through use of unique product code



# System Evolution and Functionality



- System evolved throughout development to make the system more user friendly and secure
- Pass/Fail criteria
- Perfumer review
- QMS form





# Functions

QMS button

The screenshot displays the ACD/SpecDB Database Window with the following details:

- Product Code:** 0920-3083-1
- Product Name:** HEXYL CINNAMIC ALDEHYDE
- Lot Number:** 51640
- Chromatogram:** Shows Absorbance vs. Wavelength (nm) with a prominent peak at approximately 280 nm.
- Record User Data:**
  - Product Name: HEXYL CINNAMIC ALDEHYDE
  - PROJECT: QMS
  - FLOWCHART: Raw Materials
  - STATE: Raw Materials Logged Out
  - Product Code: 0920-3083-1
  - Lot Number: 51640
  - Supplier Name: WHYTE CHEMICALS LTD
  - Purchase Order Number: 16626
  - Total Quantity: 1900
  - Description: pale yellow mob liq
  - Submitted: 03/06/2010 14:40:27
  - Submitter Name: Clare Paddison
  - Submitter Username: PZC15497
  - Submitter eMail: Clare.Paddison@sevenchemicals.co.uk
  - Viscosity Value: 1.54753
  - Density Value: 0.95488
  - Refractive Value: 0.9566
  - Reference RI Value: 1.550
  - Reference Density Value: 0.954
  - Reference SG Value: 0.956
  - D/SG Data Added Date: 03/06/2010 15:56:59
- QMS Dialog Box:**
  - Product Code: 0920-3083-1
  - Lot Number: 51640
  - Buttons: Find Lots, Find Lot, Find Perfumer Review, Find Reference, View FTIR Overlay, View GC Overlay, Reprocess Sample, OK, Cancel.
- QC Approval Comments:** Empty
- QC Quarantine Comments:** Empty
- QC Rejection Comments:** Empty
- QC Approved:** PZC16548
- Perfumer Approval Comments:** new ref urgent
- Perfumer Quarantine Comments:** Empty
- Perfumer Rejection Comments:** Empty
- Perfumer Approved:** PZC14227
- MARCO Status:** Approved

Perfumer review

The QMS form allows for quick searching for previous examples of the same material, the reference data for the material, initiate GC and FTIR overlays, reprocess samples and search for all items for the perfumery departments attention



# Results

*“Seven now have a fully transparent and auditable data management system to help ensure product quality and traceability.....”*

World Class Manufacturing Audit Findings (May 2010)

- Controls stock movement within the WMS
  - Automated status updates
- Collates all associated testing data with specified lot number
- Allows for secure auditable sign-offs
- Auto-generates Certificates of Analyses
- Reduce QC analysis time by 25%



# Further Improvements

- New workflows incorporating QA functions
  - Supplier C of A's
- Removal of obsolete workflows
  - Some initial workflows not used
- GC HQI results
  - To allow pass/fail criteria to be applied
- Trend analysis
  - Tracking supplier quality
  - Specification creep
    - Impact of naturals



# Summary

- Seven
  - Worldwide fragrance company
- Drivers
  - Quality
- Implementation
  - Project creep
- System
  - Running with good functionality
- Robust, auditable and secure data management system



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