



We protect and
beautify the world





PPG Global Supplier Webinars – Technical Training



Technical Training Agenda



Supplier Quality Requirements

Adila Cizmic / Ruth Zorrilla / Luisa Gutierrez

Incoming Raw Material Quality

John Hargreaves

Contamination Prevention

Benjamin Benito / Jean Pierre Strinati

Q&A

Expectations and Take Aways



Q&A

Questions sent via Slido were integrated to the presentations. You can raise further questions via chat.



Awareness

Deploy the information shared during the session within your organization. Help us to prevent quality issues!



Partnership

Work together and collaborate to reduce quality risk.
Have a closer and open communication with PPG, we are partners!



PPG Automotive Supplier Quality Requirements

Luisa Gutierrez – Supplier Development Manager EMEA



PPG Supplier Quality Requirements

SUPPLIER PORTAL

Supplier QMS Requirements



- * MAQMSR Expectations, including Customer Requirements
- Change notification
- COA Requirements
- Supplier Audit Process

Contamination Prevention



- Bulk Transport Requirements
- Packaging Policy
- Global MRL List
- Materials Handling
- Crater prevention training

Supplier CAIR



- Notification of new non conformities
- Corrective/Preventive actions reports

*Minimum Automotive Quality Management System Requirements

TRAINING AND AWARENESS



- Training material shared via supplier portal, email notifications and supplier days
- Active communication with suppliers for training and awareness:
 - ISO/IATF Requirements
 - PPG and Customer Specific Requirements
 - Statutory and Regulatory Requirements
- First Global Supplier Webinar in 2021

PPG Supplier Quality Requirements

Accessible to all the suppliers:

<https://corporate.ppg.com/Purchasing/PPG-Supplier-Network/PPG-Auto-OEM-Supplier-Quality.aspx>

PPG Supplier Network

PPG Automotive Quality

PPG Automotive Coatings
Supplier Quality
Requirements



Contents

- [SQR00_PPG Automotive Summary of Recent Changes](#)
- [SQR01_PPG Automotive QMS Requirements for Suppliers](#)
- [SQR02_PPG Automotive Change Notification Requirements](#)
- [SQR02a_PPG Automotive Change Notification and Approval Form](#)
- [SQR03_PPG Automotive COA & Shelf-life Requirements](#)
- [SQR04_PPG Automotive Supplier Audits](#)
- [SQR05_PPG Automotive Supplier CAIR \(Supplier Nonconformance Report\)](#)
- [SQR05a_Supplier 8D Report Form](#)
- [SQR06_PPG Automotive Sites in the scope of these requirements](#)

Contamination Prevention

- [SQR07_PPG Automotive Bulk Transport Requirements](#)
- [SQR08_PPG Automotive Recycled, Reconditioned and Rebottled Packaging Policy](#)
- [SQR09_PPG Automotive Equipment Cleaning Guidelines](#)
- [SQR10_PPG Automotive Guidelines for Reusable Steel Totes](#)
- [SQR11_PPG Automotive Global Material Registration List](#)
- [SQR12_PPG Automotive Low Surface Tension Materials Handling](#)
- [SQR13_PPG Automotive Guideline on Personnel and Workplace Contaminants](#)
- [SQR14_PPG Automotive Coatings Crater Prevention Training](#)

Regional Requirements

- [SQR15_PPG Automotive EMEA Requirements](#)
- [SQR16_PPG Automotive Mexico Requirements \(English & Spanish version\)](#)
- [SQR17_PPG Automotive Brazil Requirements \(English & Portuguese version\)](#)

Contact us

[SQR18_PPG Automotive Contact List](#)



Supplier QMS Development – MAQMSR



What is the IATF 16949?



Global Industry Standard created by the International Automotive Task Force (certification bodies, auditors, suppliers and OEMs).

It harmonizes the different assessments and certification systems in the global automotive supply chain.

PPG is IATF 16949 certified and is a leading supplier to the Automotive Industry

As per IATF 16949 requirement, ALL PPG Automotive Coatings suppliers must be ISO9001 certified.

Supplier QMS Progression



- **MAQMSR**
- **ISO 9001**
- **3rd party cert.**
- **Compliance**



PPG Automotive Coatings requires:

- **Minimum ISO 9001** certification
- **Does not require** suppliers to be IATF 16949 certified at this time
- **Both PPG and suppliers** need to have plans in place to progress and adhere to the MAQMSR

What are the MAQMSR?

******Minimum Automotive Quality Management System Requirements*****

It is a guideline developed by FCA and Ford and it is intended to be used by Tier 1 suppliers to develop lower Tier automotive suppliers.

PPG
Automotive
Coatings
suppliers
are here





Supplier Audit Process





Supplier Audit Process


Audit Objectives

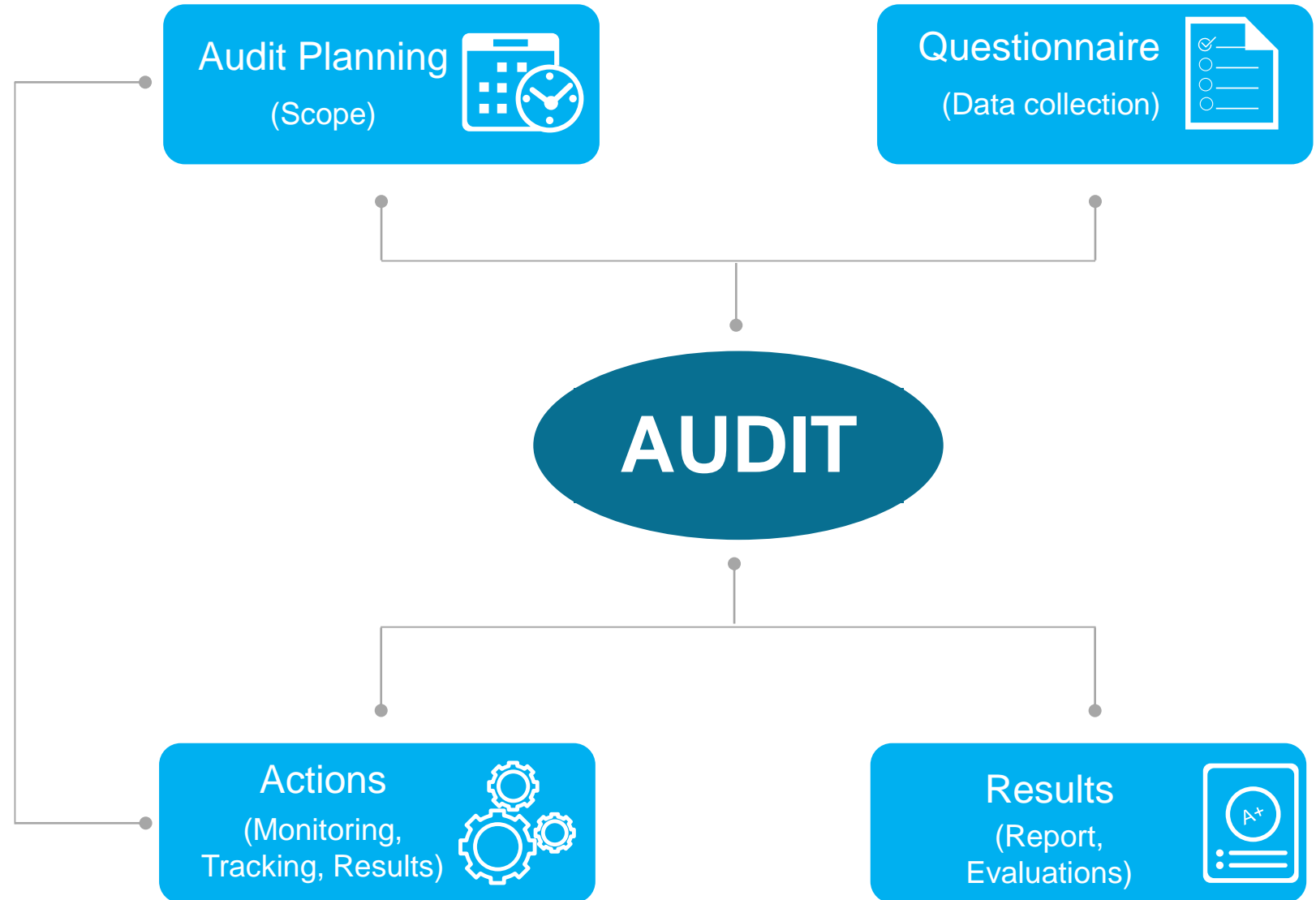
 Approve Potential Suppliers

 Develop Current Suppliers

 Educate Suppliers on PPG specific requirements

 Confirm ISO/IATF Requirements

 Check effectiveness of corrective/preventive actions



Supplier CAIR, Root Cause Analysis & Supplier Portal

Global Webinar

Adila Čizmić Mehmedović - Supplier Development EMEA



What does CAIR stand for? & When do we use the CAIR system?



- **C** – orrecting
- **A** – djustment
- **I** – ncident
- **R** - eporting

Tracking System

- Non-Conformities
- Consolidated communication channel
- Data Source
- Consistency in problem solving
- Trend analysis



PPG opens CAIR when
a non-conformity
occurs



Supplier is notified and
answers it on Supplier
Network



PPG closes
CAIR **IF**
answer is
acceptable,
and rates
Supplier

Why do we use the CAIR system?

IATF 16949 Standard



- Product conformity to requirements

- Customer disruptions at the receiving plant

- Delivery schedule performance

PPG Scorecards



- IQC¹ metrics, audit results
Supplier CAIR – quality, delivery, and documentation

- **Supplier CAIR** – Severity 3 & 4

OTIF²

IATF16949

Supplier for the
Automotive Industry



IATF 16949
Section 8.4.2.4

Supplier Monitoring



To rate supplier performances and responsiveness

Standardized problem solving



Customized action plan created
Lead Buyer involvement
Lessons learned

Sustainable Partnership



How do our suppliers access the CAIR System?



Two ways of
accessing



Internet
Browser



E-Mail
invitation



„PPG
Supplier
Network“



E-Mail address



Sent by e-mail from
suppliernetwork@ppg.com




Procurement
PPG Supplier Network
Welcome to the PPG Supplier Network

PPG suppliers are a critical link in the PPG Supply Chain. The PPG Supplier Network provides a standard infrastructure to promote PPG / Supplier collaboration.

Suppliers will require a PPG Supplier Network login to access one or both of the following applications:

- Supplier Incident Response (SIR) to view Corrective Action Incident Reporting (CAIR) Alerts or respond to Supplier Nonconformance Notice (SNN)
- Supplier Added Value Effort (\$AVE). To learn more about \$AVE, click [Learn More](#)

For suppliers already enrolled in the PPG Supplier Network - your email address is your Username. Your initial password is included in the email that was sent to you by suppliernetwork@ppg.com confirming your enrollment in the PPG Supplier Network. [Click here to login](#) 



What happens with the responses?

PPG Supplier Network

PPG

Log Out

Feedback

Applications

SAVE

Supplier Incident Response

Applications Requiring Separate Logon

Diversity Suppliers

Supplier Portal View

Cair Id 24190700001
Submit Date 07/08/2019
Supplier PPG SUPPLIER TEST

Responder Name

Root Cause
Response

Interim Fix
Implement Date mm/dd/yyyy
Response

Permanent Corrective Action
Planned Implementation Date mm/dd/yyyy
Response

Submit Return to List

CAIR Database View

Drums SLJ-78 and KAT-6361

Issued Date 10/11/2013
Due 10/25/2013
Response Received 02/16/2014
Resolved 12/11/2013

Automatic update in the CAIR system

Root Cause

Responsiveness


Problem Material Supplier **Response** Assignments (1) Dialog Attachments (1)

Root Cause **Add**
The Supplier did not have the correct PPG champ code list, resulting in confusion

Interim Fix **Add**
Interim Fix Date
PPG labeled these correctly. Added to the NEXeO Supplier Audit in Q4 2013. In discussions with Nexeo facility manager about root cause and corrective action.

Permanent Corrective Acti **Add**
PPG scheduled an audit of the Twinsburg facility to follow-up on this item. Report is attached.

Date Implemented 02/19/2014
Responder Name John Towls- Univar QC Manager
Responsiveness 3 - Good - Response with RC



CAIR Types and Severity

CAIR Typology

0 - Praise



Compliment

You are doing a great job!

1 - Incident



Internal Documentation of non-conformity

Supplier **CAN** respond

2 - Alert



Supplier receives an issue notification

ONLY notification receipt

3 - SNN



Response required with a Root Cause and Corrective & Preventive Action

Supplier **MUST** respond

CAIR Severity

1 - Minor

- Documentation errors
- For record only

2 – Important

- PPG affected or Repeat
- Escalate if chronic

3 – Critical

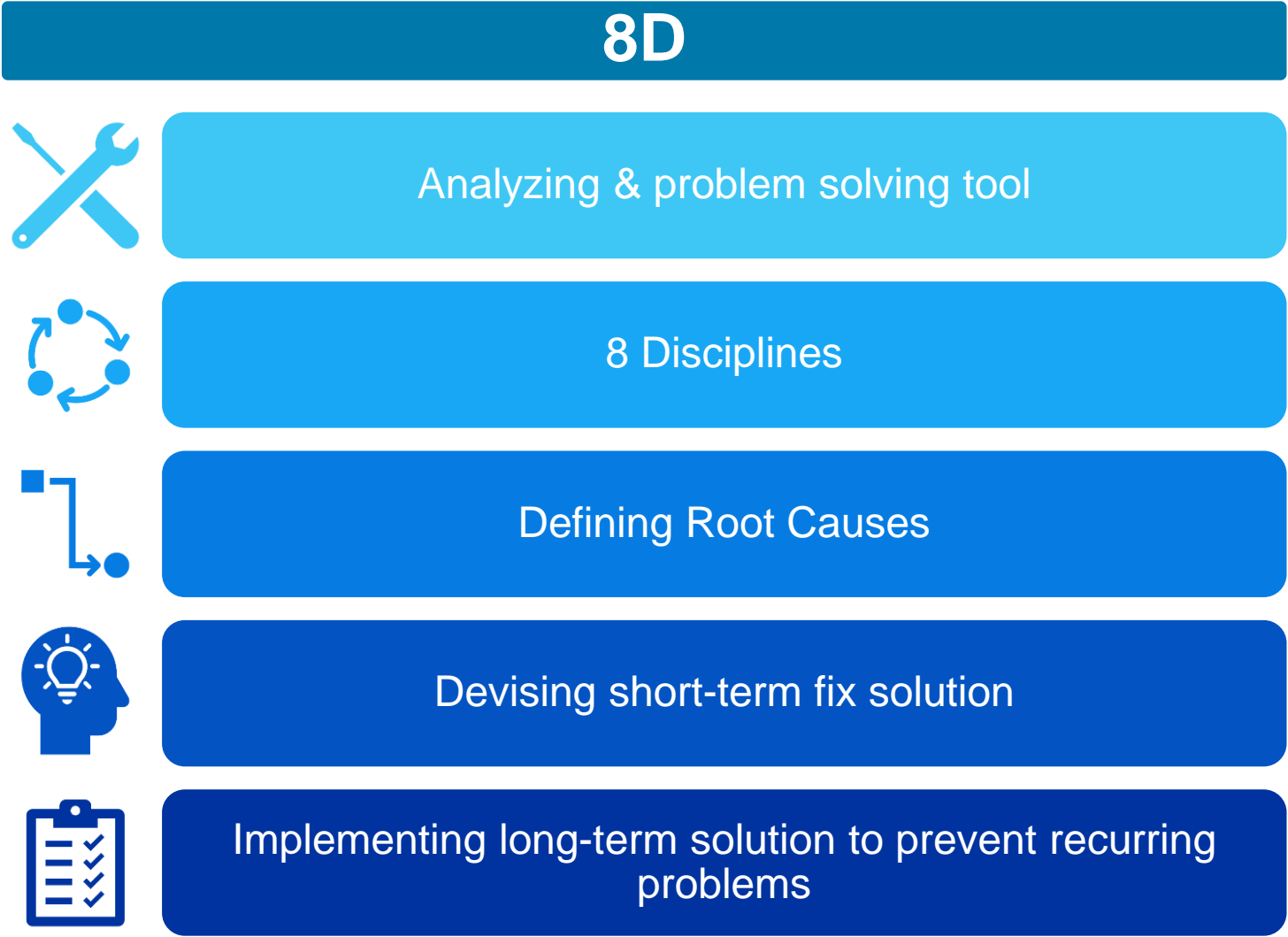
- PPG or Customer Impact
- 8D with root cause, Corrective & Preventive Actions, possibly claim

4 – Severe

- Significant Impact
- 8D with root cause, Corrective & Preventive Actions, possibly claim

8D: What is it & where does it come from?

- Ford Motor Company
- Team Oriented Problem Solving (TOPS)
- 1980



D1 Cross-functional team for problem solving

D2 Problem description

D3 Containment actions

D4 Root cause analysis

D5 Implementation of Permanent Corrective Actions

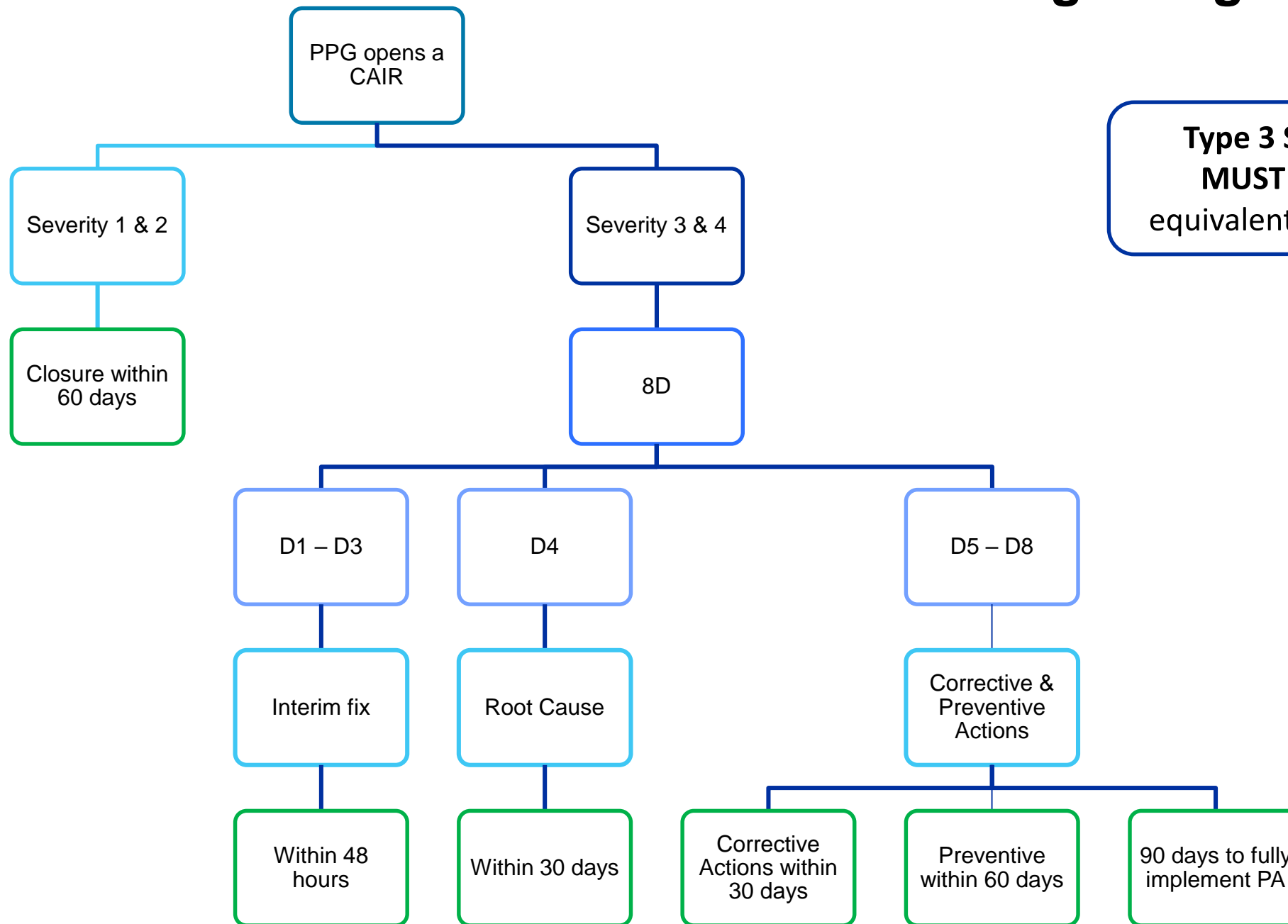
D6 Verification of Corrective Actions

D7 Standardization to prevent Recurrence

D8 Lessons Learned



What should be taken into consideration regarding 8D?



**Type 3 SNN and Severity 3 & 4
MUST have an 8D Report or
equivalent report from the supplier.**

Supplier 8D Report

Note: Supplier to complete all cells that are colored yellow. No Yellow cell should be left blank, use "N/A" if the field is not applicable to the issue.

Supplier Name: CAIR ID:
Cham Code/Description: Batch No./Quantity:
PPG Initiator: Supplier Contact:

Discipline 1: Set up cross-function team for solving problem
Note: Choose multifunctional team that will analyze and solve the problem. Important to name a Group Leader.

Function	Name	Title	Phone No.	E-mail
Group Leader				

Discipline 2: Defect Description
Note: Add clear problem description, facts and measurable data.

What
How
When
Where
How Many

Discipline 3: Containment Actions (Reply within 48 hrs)
Note: Take effective action on defected product, isolate the defect from PPG. It is essential to verify % Effectiveness and implementation date.

Containment actions	Status	Implementation Date

Supplier Delivery Requirements

Global Webinar

Ruth Zorrilla – Supplier Development Manager LATAM



Documentation Requirements



CERTIFICATE OF ANALYSIS (COA)

Must be sent 24 hours in advance of the delivery

01



Up load data into the system
Check for specification Issues



BULK TRANSPORTATION

Cleaning Certificate

02



CHAMP CODE

In All documents

03

COA Must Have



Manufacturer name and location



PPG CHAMP code



PPG PO number



Manufacturing Date



Expiration date



Specification and test methods



Summary test results, include type of inspection (EN 10203 or equivalent)



If recertify material new Expiry date

Example

CERTIFICATE OF ANALYSIS				
Manufacturer:	ACME SOLVENTS	Location:	GERMANY	
Customer:	PPG Industries	Delivery Date:	15/01/2019	
Product:	MAGI-SOL* 150	Manufacturing date:	01/01/2019	
PPG Code:	SL-01-0101	Expiry Date:	01/01/2020	
TEST	RESULTS	UNITS	SPECS	TEST METHOD
Total Aromatics	99,9	%Vol	98MIN	D-1319
Sulfur	<0,02	ppm	5MAX	D-5453
Benzene	<1	ppm	50MAX	M-0002
Flash Point	157	°F	150MIN	D-56
John Labguy QC Technician				

Shelf life requirements

Any material shipped into a PPG facility

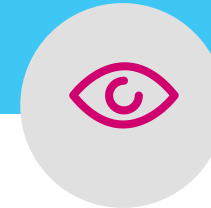
Shall have a
minimum of
50% of
remaining
shelf life



Or a minimum
of 6 months,
for shelf life
values
exceeding 1
year



Any material
out of
specification
will be rejected



Delivery Requirements



PPG Change Notification Requirements for Suppliers

1

Must have a system for changes management

2

Notify PPG at least 90 days prior date of change

3

Changes with potential effect on performance and regulatory compliance

Notification is required for changes:

- Raw material new or existing supplier
- Process equipment or parameters
- Any change in formulation or ingredients level
- Manufacturing site
- Specification and/or test method for a certified property
- Material Safety Data Sheet (MSDS)
- Packaging or its characteristics

Approval from PPG

PPG reserves the right to evaluate the impact of the proposed change and the approval process for each case.

Incoming RM Quality

Global Webinar

John Hargreaves – Raw Material & QA Manager

Control of Incoming Quality



Incoming RM Quality: CofA Receipt



PPG Champcode

Raw Materials CoA Login

No matching CoA is found. Do you want to log in a new CoA?

Item Code	Item Description	Lot Number	Supplier
RM-35-6039		DUFF234	

Manufacturer	Manufacturer's Item Description	Manufacturer Location	Manufacture Date *
Select Manufacturer			1/16/2018

Lot Status *	Original Expiration Date	Effective Expiration Date
Lot Created	1/16/2019	1/16/2019

CoA Indicator	CoA Signal	Number of Tests
<input type="checkbox"/> Late <input type="checkbox"/> Non-Conforming	Pending	

Recert Interval	Maximum Recert Period	Skip Lot Frequency
180	540	0

First Lot Frequency	Skip Lot Comments
0	

COA Required	Receipt Level
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Org RM Comments	Skip Lot Comments

+ Create Lot and Enter Results

Create Lot

Cancel

Approved Supplier Check: Dropdown box lists approved Suppliers for each raw material. The Supplier is selected during the COA entry

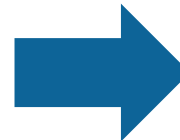


Incoming RM Quality: CofA Data Entry



Batch ET8L02674
Material no 919594
Manufactured date 01/05/2019 / Expiry date 07/04/2019

Characteristic	Unit	Lower Limit	Upper Limit	Value	Test Method
Acid Value, MEQ	meq/g	0.189	0.219	0.193	
Acid Value, NVM					
Acid Value, NVM		20.0	25.0	21.3	FG001
Acid Value, NVM					
Total Base Value, MEQ	meq/g	0.123	0.143	0.143	FG115
Base, mEq/gram, Colorimetric					
pH		6.00	7.00	6.78	PP006
pH VWR Model 8100 w/Glass Electrode					
Seed Test		0	5	1	AC209
Seed test, Cleanliness by Mirror					
Particle Size	Å	600	1800	835	PP019
Particle Size, PP019					
Non-volatile Mass (NVM)	%	49.00	52.00	50.57	NV109
NVM, ASTM METHOD D2369-67					
Viscosity, Brookfield, RVT	cPs	40.0	500.0	163.0	VS004
Viscosity, Brookfield, RVT, #2@100rpm/s					



CoA Results Entry

RM Lot Comment

Org RM Comments

CoA Indicator

☐ Late ☐ Non-Conforming

CoA Signal

InSpec

Lot Status *

CoA Approved

PPG Internal Specifications

Export to Excel

Property	Test	Test Rqmt	Lower Spec	Upper Spec	Results	OOS	OOC	Disp	TM Remarks	Local Instruction	Test Comment
AC# - ACID NUMBER	ACD POTN P09	C	20	25	21.3	=		3	SW=0.5 GM		
PH - pH	PH PH P01	C	6	7	6.78	=		3	CERTIFY		
TSW - TOTAL SOLIDS BY WEIGHT	T/S 1HR P01	C	49	52	50.57	=		3	SW=0.5 GRM REDUCE WITH WATER		
TYP - TYPE	QA SPC RM	L	PASS	PASS				3		SPC-PH, ACD POTN, T/S 1HR, VIS BRKF	
VIS - VISCOSITY	VIS BRKF P01	C	40	500	163	=		3	#2@100 RPM RV		

Incoming RM Quality: Risk and Testing Matrix



PLEASE READ INSTRUCTIONS BEFORE EDITING DO NOT		25 Risk (probability) Variable QA Local	15 Risk (probability) Variable Finance Local	10 Risk (probability) Fixed QA Control/Local	15 Risk (probability) Fixed QA Control	5 Risk (probability) Fixed GPS Control	10 Risk (probability) Fixed Purch, SO, QA, Technical Local	10 Risk (probability) Variable QA Control	10 Criticality (consequence) Variable Technical Control/Local	10 Risk (probability) Variable QC Local				
Plant	ChampCode	Quality Rate	SSPL Generated	Process Adaptation	Profitability	Shelf life	Transportation Risk	Supplier Audit Result	# of active Formula containing the RM	Miscellaneous Risk	Additional Comments regarding Miscellaneous Ri	Checkpoint 1 If "Incomplete" Finish columns F-H before	Criticality Score	Critical Raw Material Level: 160 or higher
		What is the level of Quality Supplied in the last 24 months (# of rejections: include approved and out of specification) for this Raw Material and Supplier?	Did the Raw Material implied generation of SSPL in the past?	Did the Raw Material imply a change in the process in the past?	Which is the level of profitability of supplier?	How long is the shelflife of the Raw Material?	How likely the Raw Material could be damaged during its transport to PPG?	What was the output of last audit performed to this supplier?	How many active formulas contain this Raw Material?	Please add any additional Risk not considered in the matrix (if available) and explain in the column 'Y' the reason to add the risk level				
		1) 0 Rejection 2) 1 Rejection 3) > 1 Rejection	1) never caused SSPL in last 2 years 2) caused SSPL in last 2 years 3) cause of SSPL in last 1 year	1) no changes in production process required in the last 12 months 2) changes notified in the last 12 months	1) Low impact 2) Medium 3) High impact	1) more than 12 months 2) between 6 and 12 months 3) less than 6 months	1) Local Supply, product not sensitive to T/C 2) Local Supply but product sensitive to T/C; Intercontinental Supplier but product not T/C Sensitive	1) Pass 2) Caution 3) Fail	Rating 1) 0 to 40 2) 41 to 300 3) more than 300	1) None-Low 2) Medium 3) High				
US-Cleveland	KC-15-6406	1	1	1	3	1	1	1	3	1			160	C
US-Cleveland	KC-22-2381	1	1	1	1	1	1	1	1	1			110	
US-Cleveland	KC-62-5506	1	1	1	3	1	2	1	1	1			150	
US-Cleveland	KC-65-2693	3	1	1	1	1	2	1	1	1			170	C
US-Cleveland	KC-92-5004	1	1	1	1	1	2	1	1	1			120	
US-Cleveland	KCG-2686	1	1	1	1	1	1	1	3	1			130	
US-Cleveland	KCM-4085	1	1	1	1	1	1	1	3	1			130	
US-Cleveland	KCP-1285	1	1	1	1	1	1	1	2	1			120	
US-Cleveland	KCT-198	1	1	1	1	1	1	1	3	1			130	
US-Cleveland	KCV-1463	1	1	1	1	1	1	1	1	1			110	
US-Cleveland	KCY-7291	1	1	1	1	1	1	1	3	1			130	
US-Cleveland	KCZ-1591	1	1	1	1	1	1	1	1	1			110	
US-Cleveland	KF-81-2799	1	1	1	2	2	2	1	2	1			150	
US-Cleveland	KH-11-5202		1	1	1	2	1	1	2	1			125	
US-Cleveland	KH-21-3799										CLR		175	C
US-Cleveland	KH-34-5514										Bulk + CLR		170	C
US-Cleveland	KH-37-2592												115	
US-Cleveland	KH-51-5580												155	
US-Cleveland	KH-63-4455												130	
US-Cleveland	KH-77-7534												125	
US-Cleveland	KH-91-9045												130	
US-Cleveland	KHL-7708												130	
US-Cleveland	KHR-8721												125	
US-Cleveland	KP-23-4161												155	
US-Cleveland	KP-24-5248												155	
US-Cleveland	KP-63-7499												155	
US-Cleveland	KP-77-3773												125	
US-Cleveland	KP-91-2001										CLR		160	C
US-Cleveland	KP-99-2020												120	
US-Cleveland	KPV-6257												130	
US-Cleveland	KPY-607	1	1	1	1	1	2	1	3	1			140	
US-Cleveland	KPY-7875	1	1	1	1	1	3	1	3	2			160	C
US-Cleveland	KPY-8538	1	1	1	1	1	2	1	2	1			130	
US-Cleveland	LC-19-8715	1	1	1	1	3	2	1	2	1			140	
US-Cleveland	LC-24-4644	1	1	1	2	3	3	1	1	1			155	
US-Cleveland	LC-26-8656	1	1	1	1	3	2	1	2	1			140	
US-Cleveland	LC-38-5745	3	1	1	1	3	3	1	3	3			230	C
US-Cleveland	LC-44-2202	3	1	1	2	3	1	1	1	1			195	C
US-Cleveland	LC-53-8927	1	1	1	1	3	2	1	2	1			140	
US-Cleveland	LC-55-1321	1	1	1	3	3	2	1	2	1			170	C
US-Cleveland	LC-61-6177	1	1	1	3	3	2	1	2	1			170	C
US-Cleveland	LC-64-8549	1	1	1	1	3	2	1	2	1			140	
US-Cleveland	LC-65-7611	1	1	1	2	3	2	1	2	1			155	
US-Cleveland	LC-76-3182	3	1	1	2	3	2	1	3	1			215	C

Major Risk Factors:
 Quality History
 Active Formulas and Profitability Contribution
 Shelf Life and Transportation Risk



Incoming RM Quality: Sampling Methods



Tank Wagon Sampling



Drum Sampling



Incoming RM Quality: Chemical Conformity Testing



NIR Identity and Conformity Testing

RM Sample Results Entry

Receipt Number 24549 - 1/14/2019 10:15:3...	Sample Number 1	CoA Signal InSpec	RM Sample Status RM Approved	Initials
RM Lot Comment				
RM Sample Status Comments				
Org RM Comments		RM Retain Location		

Export to Excel												
Sample Number	Prop Code	Test	Lower...	Upper...	Results	User	Disp	Lot Only	OOS	OOC	TM Remarks	Local Instructions
1	APP	APR VISL P01	PASS	PASS	PASS	QA RM Analytical	3		=		MILKY WHITE EMULSION	
1	IRA	IRA NIR PF	PASS	PASS	PASS	QA RM Analytical	2		=			



Level 2 Failure

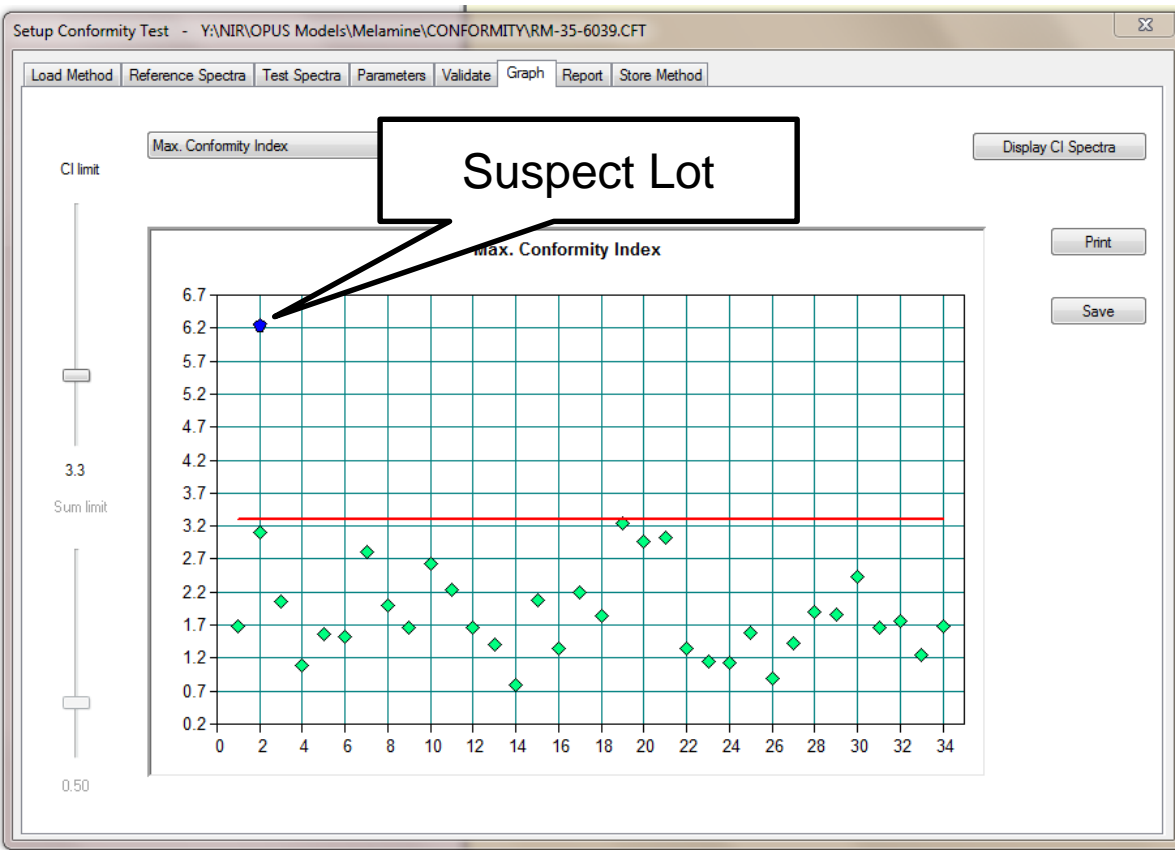
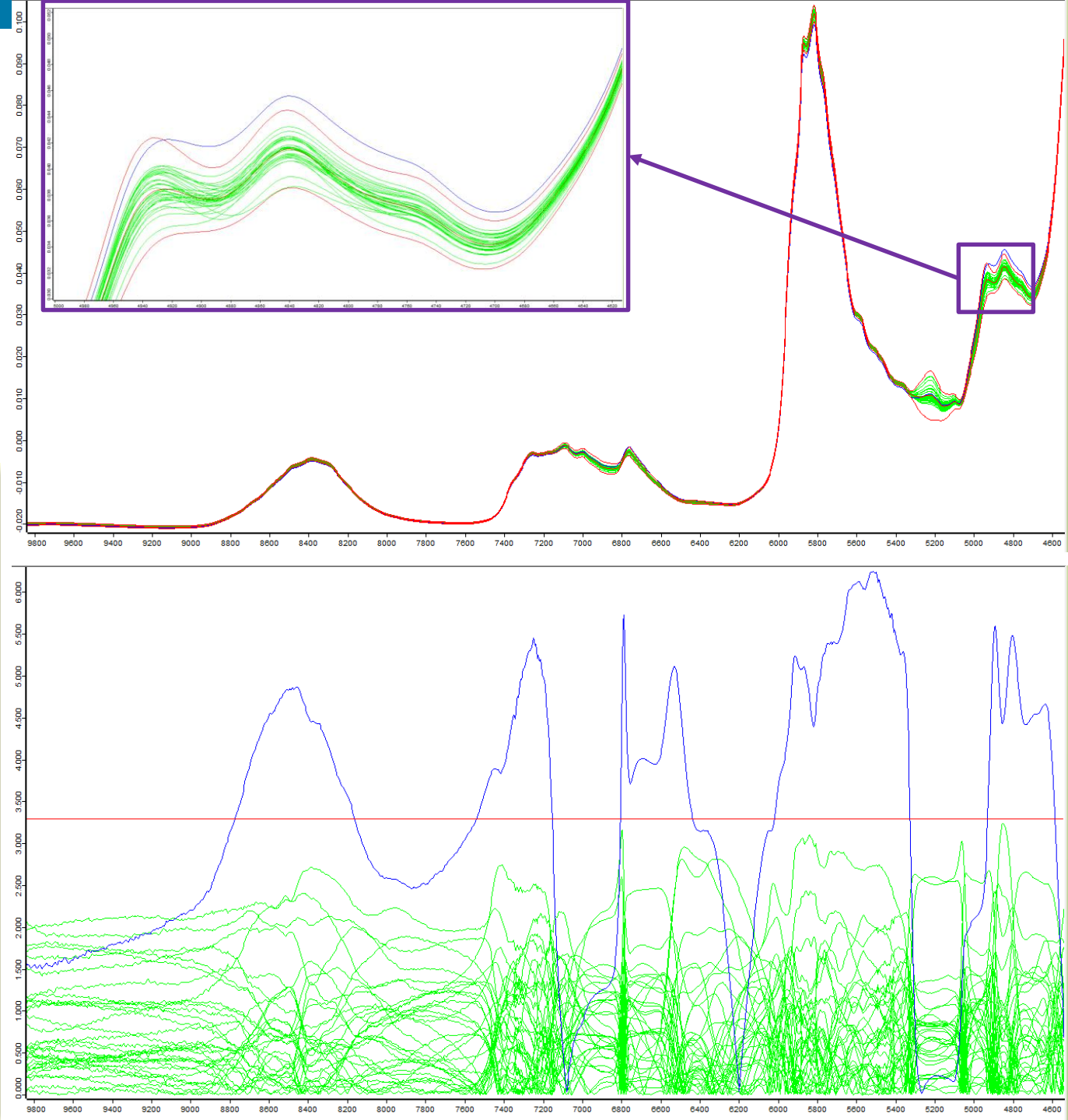
RM-1 S1602T1208

Max CI value: **6.23**

Points Out: **446**

Investigation: Supplier added 2% butanol due to a stuck valve which caused slightly higher MW.

Disposition: Approved for use by technical.



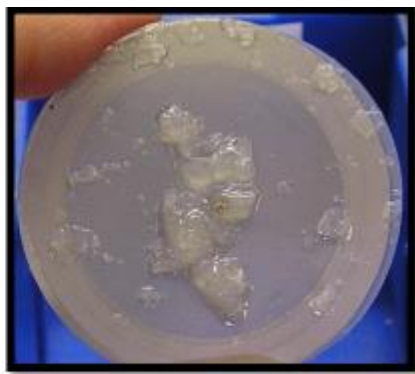
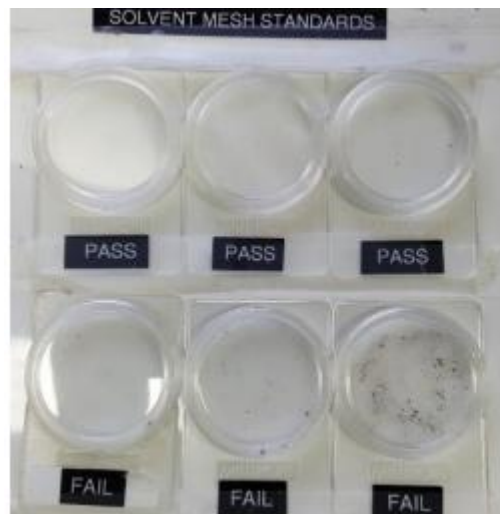
Incoming RM Quality: Contamination Testing



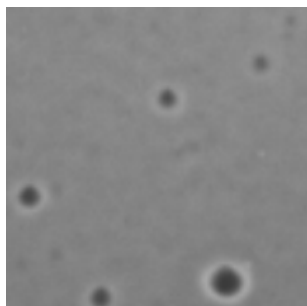
Impact of PDMS on OEM Coatings

Examples of Dirt and Gel Tests

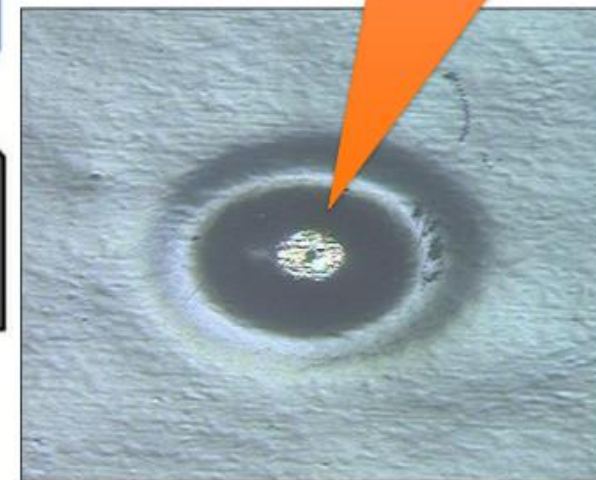
Examples of Contamination Tests



*Cleveland Plant QA RM QWI-010
Gels are an automatic fail*



The paint has crawled away from the tiny droplet of contaminant to form a crater



Magnification of a crater defect on a vehicle

Incoming RM Quality: Approval / Rejection



Approval

PPG Quality Logged in as HARGREAVES, JOHN J PPG CLEVELAND (AMP)

Search

Supplier	EASTMAN CHEMICAL CO	Item Code	SSE-86	Lot Number	TD21028463	Sample Number	1
Manufacturer	EASTMAN CHEMICAL	Item Description	N-BUTYL ACETATE URETHANE GR/	RM Lot Status	CoA Approved	RM Sample Status	RM Approved
Manufacturer Location		Receipt Number	60672	Lot Status - Date/User	9/9/2021 by MICKEY, DUANE R (SYS)	Sample Status - Date/User	9/9/2021 by MICKEY, DUANE R
Manufacturing Date	9/7/2021	Receipt Date	9/9/2021 5:16:38 AM	Expiration Date	9/1/2022	QC Inventory Status	Good
PO Number	395911	Quantity	45020	UOM	LBS	RM Spec Version	4

Rejection

ORACLE DOCUMENTS	Quality Tool Raw Material Quality Control		
TYPE	Oracle Work Instruction	ID #	OCI QC-004
CATEGORY:	Quality Control	PAGES	Page 12 of 17
SUB-CATEGORIES:	Raw Materials	REVISION #	1
DOCUMENT APPROVER(S)	Karen Bartos, Laurie Duffy, Lula Malaj	REVISION DATE	1/18/2018

ASSIGN LOT FINAL "RM SAMPLE STATUS"

- After all sample results are entered, a final **RM Sample Status** should be assigned as appropriate.
- The system displays a warning when Approving samples with results Out Of Spec, and permission is required to continue.
- RM Sample Comments** – System required when results are OOS.
- To Reject a RM sample, select "RM Rejected" as the RM Sample Status and press "Save".
- The final lot status communicates with EBS and assigns the appropriate **QC Inventory Status**.
- The **RM Lot Status** and **RM Sample Status** are used to generate a **QC Inventory Status** according to the grid referenced previously.
- The **QC Inventory Status** is displayed in the header. It is color coded green for **GOOD**, yellow for **HOLD** and red for **REJECT**. This is the status that is used to feed EBS.

Supplier	Item Code	Lot Number	Sample Number
INEOS MELAMINES	RM-35-6039	5171173026	1
Manufacturer	Item Description	RM Lot Status	RM Sample Status
	RESIMENE 758	CoA Approved	RM Hold
Manufacturer Location	Receipt Number	Lot Status - Date/User	Sample Status - Date/User
	5121	1/12/2018 by Duffy, Laurie	1/12/2018 by Duffy, Laurie
Manufacturing Date	Receipt Date	Expiration Date	QC Inventory Status
11/30/2017	11/30/2017 6:48:37 AM	11/30/2019	Hold
PO Number	Quantity	UOM	RM Spec Version
PCL1-95280	43810	LBS	2

Contamination Prevention

Jean-Pierre Strinati - Quality Manager Automotive France

Benjamín Benito - Quality Assurance Manager Spain & Portugal



CONTAMINATION PREVENTION

IT'S TIME TO LEARN ABOUT
CRATERS / CONTAMINATION,
AND WHY WE SHOULD
ELIMINATE THEM.

INTRODUCTION, KNOW THE THREAT

P.01 Introduction, Know the threat

P.02 Identify the contaminants

P.03 Eliminate the contaminants

P.04 Summary



We protect and
beautify the world™

- ✓ Contamination that causes craters continues to be one of the biggest issues in Automotive Coatings
- ✓ Crater investigations have identified contamination sources in our raw material, transport, maintenance, production processes and all over our supply chain
- ✓ Awareness training is part of PPG's overall contamination prevention strategy
- ✓ Craters are terrible threat, but with your help we can stop them!!!

What are craters and how are they formed?

What is the impact of craters on our business?



What is a crater?

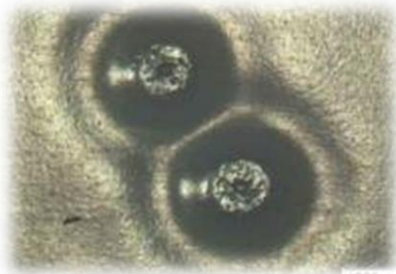
Craters are dish shape deformations in a paint surface caused by the presence of a low surface tension contaminant. It is also called a 'fish eye'. The difference in the surface tension of the contaminant and the surface tension of the coating causes the paint to 'crawl' away from the contaminant.

Besides the unacceptable appearance, the film thickness at the crater site is below specification.

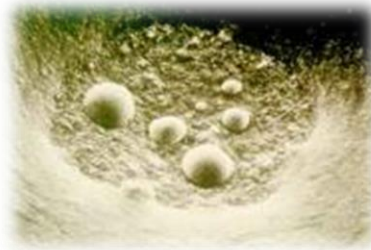
What do craters look like?



Crater with particle



Crater with particle of aluminum



Crater contaminated with oil



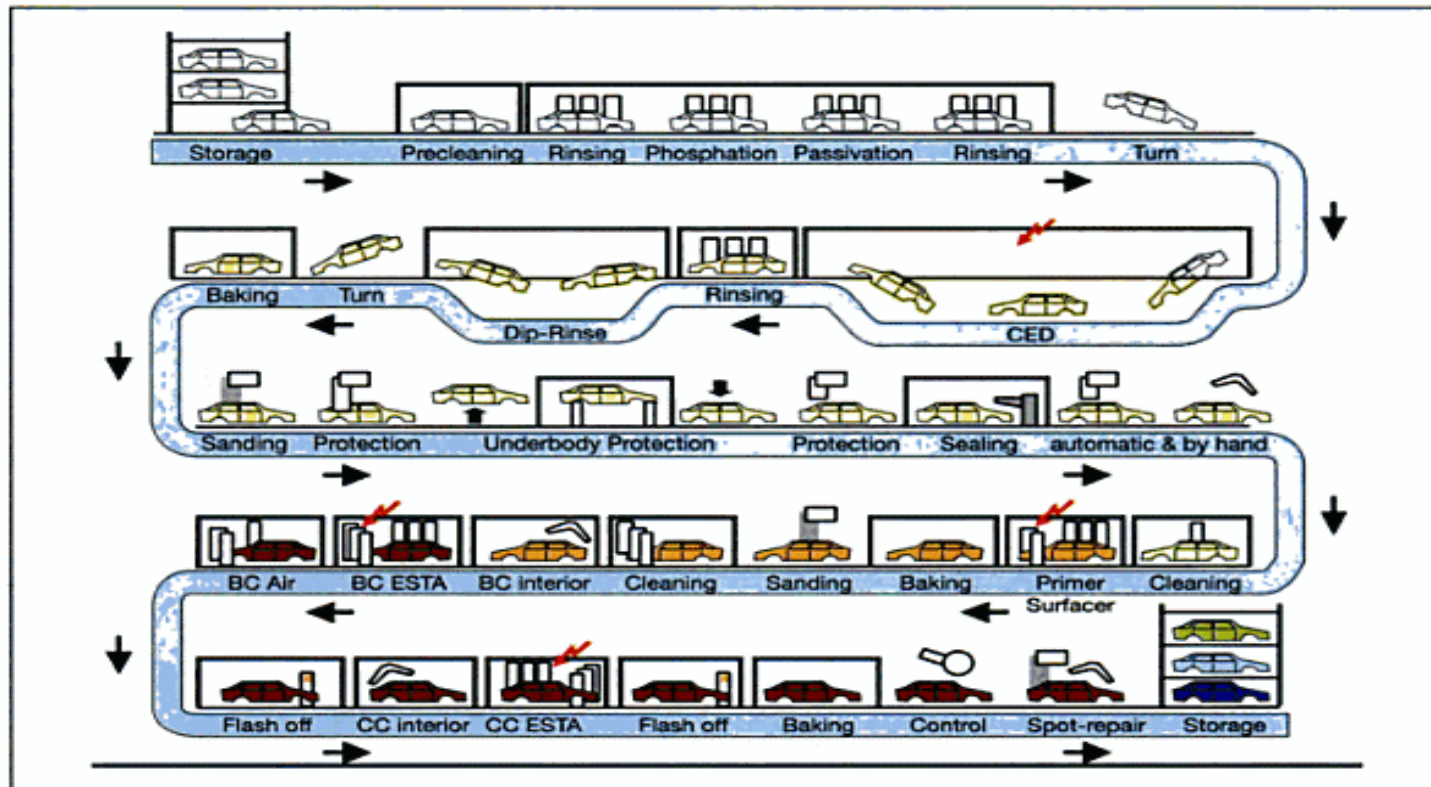
Crater from volatile contaminant

Crater contamination at an automotive site

The presence of low surface tension contaminants causes craters

Contamination could be in the paint, in the atmosphere or on the surface of the vehicles being painted

Even very **small quantities** of the contaminant in the paint can cause craters - **less than 0.001%**



Typical stages in an OEM paint process

CONTAMINATION PREVENTION

LEARNING TO IDENTIFY
CONTAMINANTS IS
ESSENTIAL TO ELIMINATE
CRATERS.

IDENTIFY THE CONTAMINANTS

P.01 Introduction, Know the threat

P.02 Identify the contaminants

P.03 Eliminate the contaminants

P.04 Summary



We protect and
beautify the world™

P.02 Identify the contaminants

Contaminant can be all over the entire supply chain

Risk Analysis is needed to stop them

Crater contaminants are a destructive threat that can hide in a wide range of chemicals.

You must check, test and verify any chemical product before using it because, in many cases, you cannot tell if a material will cause craters by only looking at the ingredient label.

**What kind of materials cause craters?
Where would we encounter these materials?**



CHEMICAL FAMILIES THAT CAN CAUSE CRATERS & SEVERE CRATERS



LEVEL OF THREAT:

HIGH

These are three of the key chemical families that can cause craters:



1. Petroleum based oils and greases

Some materials in this category cause craters, depending on the structure of the oil and the additive used to enhance the properties.

2. Detergents and defoamers

These materials can cause craters, depending on their composition.



3. Chemical additives

Chemical additives used to enhance properties in a range of materials can contaminate products and cause craters.



These two chemical families can cause **SEVERE** craters. Therefore, they are our greatest enemies:



1. Silicones (polysiloxanes)

Polysiloxanes are popular ingredients in a large range of maintenance materials, release agents, personal care products (lotions, anti-perspirants, hair gels, etc.).

These silicones can hide in ourselves!

Also Poly-di-methyl-siloxane (PDMS) based additives have caused craters.



2. Perfluoropolyethers (PFPE)

Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer of tetrafluoroethylene that has numerous applications. The best known brand name of PTFE-based formulas is Teflon™

They are typically used in high temperature greases.

WHERE DO WE **ENCOUNTER** THESE INGREDIENTS?

MAINTENANCE MATERIALS

Maintenance and engineering areas depend on the use of a wide range of oils, greases, waxes and chemical compounds that have a low surface tension to keep the machines running



LUBRICANTS

Agitator gear boxes, liquid valves.



SEALANTS

Valve connections or gauge/regulator fittings.



CUTTING OILS

Cutting steel in the fabrication and repair of equipment.



ADHESIVES

Used to cement equipment pieces together.

But not all maintenance materials cause craters, we must test them before using them near raw materials or the paint to be sure of their safety.

CONSUMABLES MATERIALS



GASKETS

Used in fittings to connect hoses, valves, etc.



RUBBER BANDS (LARGE SIZE)

Used to secure plastic covers on portable tanks or to secure empty drums on a skid.



NITRILE GLOVES

Used in both production and laboratories.



DRUM FAUCETS

Used to draw liquids from containers.

All molded or extruded products can be a **source of contamination** since their production involves the use of **silicones (one of our greatest enemies!)** as release agents in the extruder to allow a smooth release of the tubes.

But we can trust in the products made by blow molding, where cold air is used to chill and help release the part from the mold, therefore no release agents are used. *Example: plastic drums and IBC (plastic totes).*

Consumables are materials used in manufacturing, re-packaging and at our customer sites, and **they are a potential threat due to the materials used in their production.**



FILTERS

Filament and cartridge type filter media used to strain liquids.

Silicone infused thread used to sew sides of filter bag.

Recycled material used to fabricate the filter media.



PACKING

Braided pump packing.

Some brands are coated with silicone or PTFE.

Threat: Dangerous materials used in the production process of the filters and packing.

ROAD TANKERS OR TANK WAGONS USED FOR BULK TRANSPORT

If the wagons are not dedicated then the prior contents (solvents, resins,) can become crater contaminants.

Hoses, fittings, gaskets, valves associated with the wagons can potentially be contaminated – if new or not cleaned properly.



Tank Wagons/Road Tankers Delivering Non-Solvents

- Dedicated wagons are recommended where possible
- If the wagon is NOT dedicated, then wagon selection based on prior content is critical
- Use of an EFTCO or approved by PPG cleaning station is also key
- PPG's Prohibited Prior Contents list must be adhered to when selecting the wagon
 - Oils & Greases - Materials with Low Surface Tension Additives - ...
 - (See Supplier Quality Requirements SQR07)

STEEL TOTES

Craters have come from contaminated caustic residue that was not rinsed adequately during the cleaning process.



STEEL DRUMS AND PAILS

Additives used in the lining of a pail or drum have leached into PPG products and caused craters.

THREAT:

- New container lining not tested before approval.
- Deep clean of the tank, steel totes or drums is not executed.



PERSONNEL RELATED SOURCES

Contaminants can be anywhere, even in ourselves!

That's why we must be extra careful of the products we use:

- Personal Hygiene products:
Lotions, deodorants, hair sprays, etc.
- Lens cleaners.
- Gloves and work wear fabrics.



CONTAMINATION PREVENTION

NOW THAT YOU KNOW TO
IDENTIFY CONTAMINANTS.
IT'S TIME TO ELIMINATE THEM

**ELIMINATE THE
CONTAMINANTS**

P.01 Introduction, Know the threat

P.02 Identify the contaminants

P.03 Eliminate the contaminants

P.04 Summary



We protect and
beautify the world™

P.03 Eliminate the contaminants

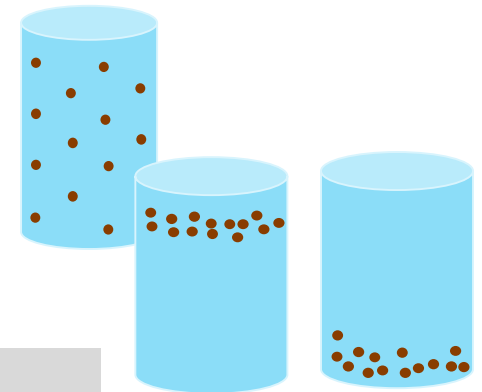
Everything would be easier if we could test the paint for craters !!!, we can but There are some problems

We need an homogeneous sample, is the contaminant evenly distributed ?, we do our best to take representative samples when we check for contamination, but we don't know if we have complete homogeneity

We try to emulate our customer's line by spraying the sample of paint with similar application parameters. But all crater checking is DESTRUCTIVE TESTING – the paint is consumed in the test.

With the homogeneity question and the reality of destructive testing, we must focus very heavily on CONTAMINATION PREVENTION!

**How do we prevent crater causing contamination?
What controls will reduce the risk?**



MAINTENANCE CONTROLS



SUPPLIER SITES

Our suppliers shall have the same quality standards that PPG applies indoors; they must be informed of any actualization in the [Materials Registration List \(MRL\)](#) of approved products and chemicals.

ASK TO FULFILL 3 SIMPLE STEPS:

1. Supplier compiles list of maintenance and production materials on site.
2. Supplier validates each material against PPG's MRL.
3. If...

NOT ON LIST:
Test or send sample to PPG for testing.

ON LIST- PASS:
Add to internal approved list and mark them with approved stickers.

ON LIST-FAIL:
Eliminate or use with restrictions (away from product processes).

Each supplier site must develop its own internal list of materials that can be used in PPG related processes and use visual aids, like approved stickers, to inform their employees.

Date	Result	Type	Material Name/Common Name	Manufacturer	Product Code / Reference No.	Site Tested
01/02/2017	PASS	Gloves	VERSATOUCH 23 IN GLOVE 23-207	ANSELL	P57BL	US - Cleveland
07/09/2018	PASS	Cleaner	V-Grade A WS Grease S508	The matchless Metal Polish Co	NOT LISTED	US - Cleveland
24/06/2014	PASS	Safety Equipment	V-Guard Visor	Meta Mine Safety	1013505	US - Cleveland
22/02/2011	PASS	Lubricant	VIC-LUBE	Victaulic	P0000000Q	US - Cleveland
11/06/2014	PASS	Gasket/Seal Packing	Viking Pump Head Gasket	Viking	2-314-001-804-15	US - Cleveland
01/02/2015	FAIL	Gasket/Seal Packing	Viking pump packing	Viking	NOT LISTED	US - Cleveland
27/04/2017	PASS	Filter Media	VILEDON DIFFUSION PWL20" X 20" FILTER	VILEDON	NOT LISTED	US - Cleveland
07/03/2018	PASS	Adhesive/Sealant	VINYL ELECTRIC TAPE	3M	700	US - Cleveland
08/03/2013	PASS	Gloves	Vinyl glove	Atiba	560 - Large	US - Cleveland
16/03/2020	FAIL	Disinfectant/Sanitizer	VIREX TB	DIVERSEY	4743	US - Cleveland
26/03/2018	FAIL	Pump/Seal Packing	Virgin Plastic PPS Valve Packing	Dover High Performance Plastics	5391-195-04	US - Cleveland
18/01/2015	FAIL	Lubricant - oil, greases	VISCOEN KLB	CASTROL		ES - Valencia
24/01/2011	PASS	Chemical	VISCOEN KLB	EVERGREEN SOLUTIONS INC.		ES - Valladolid
09/03/2012	PASS	Gasket/Seal Packing	Vise grip zinc plated plug with white gasket	Rieke	NOT LISTED	US - Cleveland
22/04/2018	PASS	Safety Equipment	Visitor coat (Bioschutzkleid) 4432x	3M Deutschland GmbHCarl Schults-Str. 50A 404679199692		DE - Wuppertal
30/06/2018	PASS	Safety Equipment	VISITOR GLASSES JACKSON V10	KIMBERLY-CLARK	UNISPEC	ES - Valencia
30/04/2018	PASS	Personal Hygiene/Medical	vita most basic hand lotion	Avon	320784 34000 21454	US - Cleveland
17/03/2015	PASS	Other	VITON O-RING	CHAPMAN MANUFACTURING	NOT LISTED	US - Cleveland
14/01/2012	PASS	Chemical	VOLTAREN EMULSION	NOVARTIS		ES - Valladolid
18/05/2014	FAIL	Safety Equipment	VULCANIZED APRON	CONDOR	47299/47299Q	US - Cleveland
06/12/2018	PASS	Adhesive/Sealant	Vulkure 138 Polyurethane Sealant	Tremco	138	US - Cleveland
18/09/2018	PASS	Safety Equipment	Warmweste	Kontex GmbhWilly-Brandt-Str. 50, 7043197_0140XAL		DE - Wuppertal
19/10/2017	FAIL	Safety Equipment	Warmweste EN 20471 Klasse 2 Klebverschluss Farbe Leuc/Bad, Gummi- und Packungsindustrie 510250007			DE - Wuppertal
19/10/2017	FAIL	Safety Equipment	Warmweste Klebteigle mit Bruttofrei dr. XL EN20471 Kleb Gummi- und Packungsindustrie 510250006			DE - Wuppertal
18/09/2017	FAIL	Safety Equipment	Warmweste mit Bruttofrei dr. Klasse 2 Klebverschluss Farbe Leuc/Bad, Gummi- und Packungsindustrie 510250009			DE - Wuppertal



Green and Red stickers are used as visual aids in the Maintenance Stores



MAINTENANCE CONTROLS FOR EQUIPMENT

All new or repaired equipment or parts in the production areas must be pre-cleaned and purged with solvent, afterwards the solvent rinse must be tested for craters.

FOLLOW 3 EASY STEPS:

1. New equipment purchased for use in the production area, like valves, is locked in a quarantine cabinet.
2. Work orders are used to ensure that each new equipment is cleaned in solvent followed by testing for craters.
3. Once approved, the equipment is bagged and tagged as ready for use.

REMEMBER: ALL new or repaired equipment must be cleaned, purged and tested BEFORE being used in the production process.

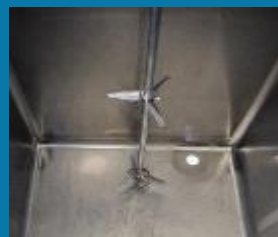


CONTROLS FOR TOTES AND CONTAINERS



STEEL TOTES

FOLLOW 3 EASY STEPS:



Tote cleaning sites are audited every year.



All maintenance materials used must be tested and approved.



Before filled with paint, totes are sampled and tested for craters.

REMEMBER: Samples can be tricky, we must be alert for any threat.

STEEL DRUMS AND PAILS



Recycled drums are prohibited.

All new containers types and interior liner formulations must be tested and approved.

Drum and pail suppliers are audited on a regular basis.

BULK TRANSPORT CONTROLS

PRIOR CONTENTS

All road tanker or tank wagon carriers for PPG (inbound or outbound) must adhere to our prior contents rules.

Prohibited prior contents have been identified and published for our suppliers and carriers.

Cleaning station shall be EFTCO approved (or PPG approved)

SAMPLING AND TESTING



Inbound solvent and resin wagons are **sampled and tested for contamination**



Any wagon with a fail result in **craters or cleanliness will be rejected.**



CLEANING



Cleaning sites and procedures must **be audited on a regular basis.**
EFTCO approved

HOUSEKEEPING



Housekeeping is crucial to reduce the risk of crater contamination in our sites:

Control of dirt, oils, greases must be built into site procedures.

Housings, connectors, ducts, filters and pipes should be kept as clean as possible.



But before applying any cleaning procedure we must:



Check that the cleaning procedures are validated as effective.



Check if the equipment is dedicated by compatible technology



Verify that the cleaning products are approved.

FOR CRITICAL PRODUCTS EQUIPMENT, RINSES MUST BE TESTED FOR CRATERS.

**PERSONNEL
RELATED
CONTROLS**
**PERSONAL CARE
PRODUCTS,
WORKWEAR & FOOD**

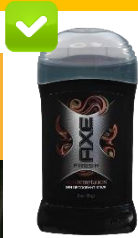
PERSONAL CARE

As we have said before, crater contaminants are a deceptive threat that can hide in ourselves. That's why each process should be assessed for risks related to operators' personal care products.

CHECK OUT THIS EXAMPLE:

24 Hr. Deodorant Invisible solid

Dipropylene Glycol, Water (Aqua), Propylene Glycol, Sodium Stearate, Poloxamine 1307, Fragrance (Parfum), Aminomethyl Propanol, Disodium EDTA, BHT, Yellow 5 (CI 19140), Red 33 (CI 17200), Green 3 (CI 42053)



24 Hr. Deodorant stick and anti-perspirant

Inactive ingredients
Cyclopentasiloxane, G-14 butyl ether, stearyl alcohol, hydrogenated castor oil, PEG-8 distearate, talc, fragrance (parfum), BHT



FOOD



For your own safety and the safety of the products:

NEVER CONSUME FOOD IN PRODUCTION AREAS

Do not risk getting poisoned or causing a crater contamination:

- Hands should be **washed PRIOR** to eating for safety reasons.
- Hands should be **washed AFTER** eating to avoid crater contamination.

All employees involved in production areas must verify that their personal care products are approved. You can't just trust in the brand, each product must be verified.

WORKWEAR

Our workwear meets two objectives: protecting ourselves and protecting our products. That's why we must ensure:

- The workwear is clean and in good condition.
- All new uniforms are tested and approved.
- In some cases, new uniforms should be pre-washed to remove any traces of silicone from the threads used for sewing the garment.
- Lint free suits are worn in application areas.

10 GOLDEN RULES



10 GOLDEN RULES



1 I follow the crater prevention process and procedures. Crater risk assessment check list used



2 I do not enter productive areas without prior authorization and "free of crater" approval.



3 I always use approved workwear in areas of production, laboratories and applications.



4 I do not introduce food to the productive areas.



5 I only use personal hygiene products approved as crater-free.



6 I work with order and cleanliness.



7 I check the contamination risk assessment is done in my working area



8 I do not use makeup, cosmetics, ...in productive areas.



9 I follow the procedures for the handling of silicone containing materials.



10 I report deviations from procedures or possible problems that may put the quality of our products at risk.

CONTAMINATION PREVENTION

NOW THAT YOU KNOW WHAT IS
NECESSARY TO ELIMINATE
CONTAMINATION / CRATERS.
LET'S PUT IT INTO PRACTICE

**REVIEW AND CHECK
YOUR ABILITIES
SUMMARY**

P.01 Introduction, Know the threat

P.02 Identify the contaminants

P.03 Eliminate the contaminants

P.04 Summary



We protect and
beautify the world™

P.04 Summary

Crater defects in our paint cost millions of dollars and are caused by the presence of low surface tension contaminants.



Prevention is key - upstream at our suppliers and entire supply chain



Numerous controls are needed for a strong prevention strategy.



Detection of contaminated product is difficult.

Summary / Actions :

- Housekeeping is key to optimizing cleanliness levels
- Strong oversight is needed for bulk transport
- Packaging must be free of contamination
- If using silicones, measures must be in place to prevent cross-contamination
- Each site should have an internal list of approved maintenance materials and consumables (refer to PPG's MRL for test results)
- All new or repaired equipment and parts in direct contact with PPG related materials must be pre-cleaned before putting in service
- For non-dedicated processing vessels, mills, piping, pumps, etc., thorough cleaning is required between batches of different products to prevent cross-contamination
- Minimize contamination risk with personnel awareness and policies – work wear, personal care products, food in the workplace
- Employees are well trained and understand the contamination prevention actions / procedures



CONTAMINATION PREVENTION

END

Jean-Pierre Strinati strinati@ppg.com
Benjamín Benito benito@ppg.com

If any question or doubt please share with us



We protect and
beautify the world™

Q & A



We protect and beautify the world™