

THE NEW (DRAFT) EN 689 (part I)

**What does it mean in daily
practice?**

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Outline

- Introduction
 - CEN standard EN 689:1995
 - draft prEN 689
 - BOHS/NVvA guidance
- Case studies
 - Company A: multinational (local plant)
 - Company B: SME
- Conclusions

CEN standard EN 689:1995 formal EU standard (1)

Number measurements	Criteria	Conclusion
1	<p>Result $\leq 10\%$ OELV</p> <p>10% < result < OELV</p> <p>Result \geq OELV</p>	<p>Compliance</p> <p>No decision > additional measurements</p> <p>Non-compliance</p>
3	<p>Each result $\leq 25\%$ OELV</p> <p>Each result < OELV & GM $\leq 50\%$ OELV</p> <p>Each result < OELV & GM > 50% GW</p> <p>Minimum 1 result > OELV</p>	<p>Compliance</p> <p>Control + periodic measurements</p> <p>No decision > additional measurements</p> <p>Non-compliance</p>

CEN standard EN 689:1995 formal EU standard (2)

Number measurements	Criteria	Conclusion
> 3	$\dot{A} \leq 0.1\%$ $0.1\% < \dot{A} < 5\%$ $\dot{A} > 5\%$	Compliance Control + periodic measurements Non- compliance

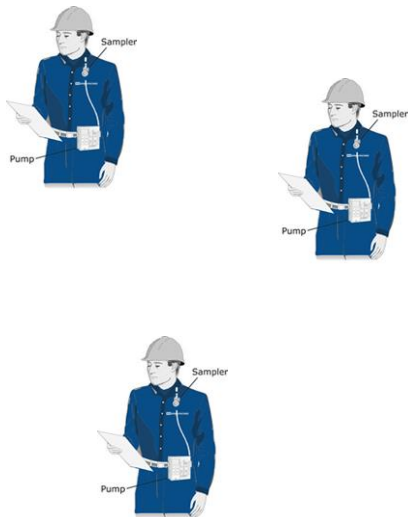
Statistical tests:

- IHSTAT
- Hygienist
-

Workplace Air Sampling European Standard Revision

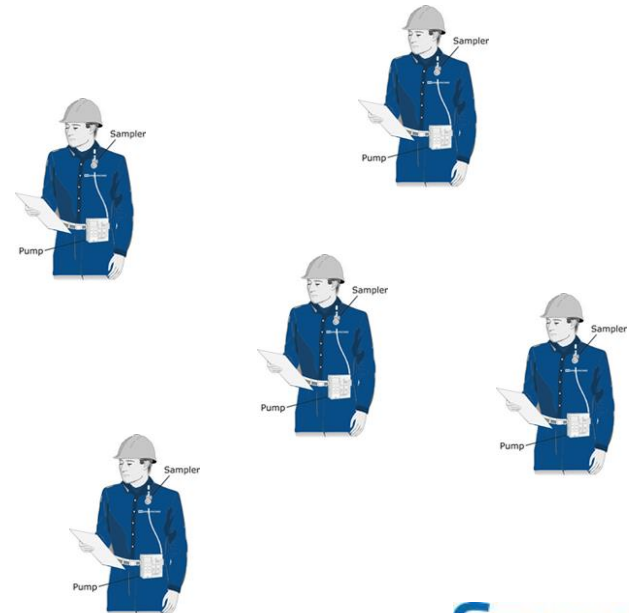
CEN Standard N689:1995

- Screening test:
minimum 1-3 samples



Draft prEN 689

- Screening test:
minimum 3-5 samples



Draft prEN689: screening test

All results <: - 0,1 OELV for 3 exposure measurements - 0,15 OELV for 4 exposure measurements - 0,2 OELV for 5 exposure measurements	Compliance
One result > OELV	Non-compliance
If all results are < OELV and a result: - > 0,1 OELV (set of 3 results) or - > 0,15 OELV (set of 4 results) or - > 0,2 OELV (set of 5 results)	No decision
Additional measurements + statistical test: at least 70% confidence, whether <5% exposures in the SEG exceed the OELV	



BOHS / NVvA guidance (2011)

Testing Compliance with Occupational Exposure Limits for Airborne Substances

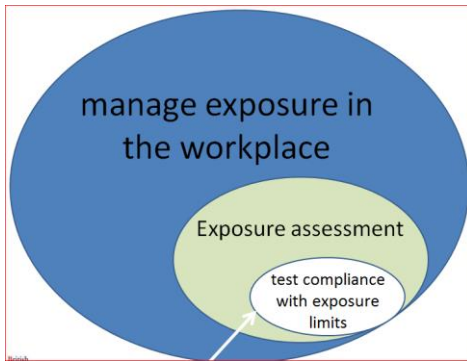


British Occupational Hygiene Society
Pride Park Derby
DE24 8LZ, UK
www.bohs.org

September
2011



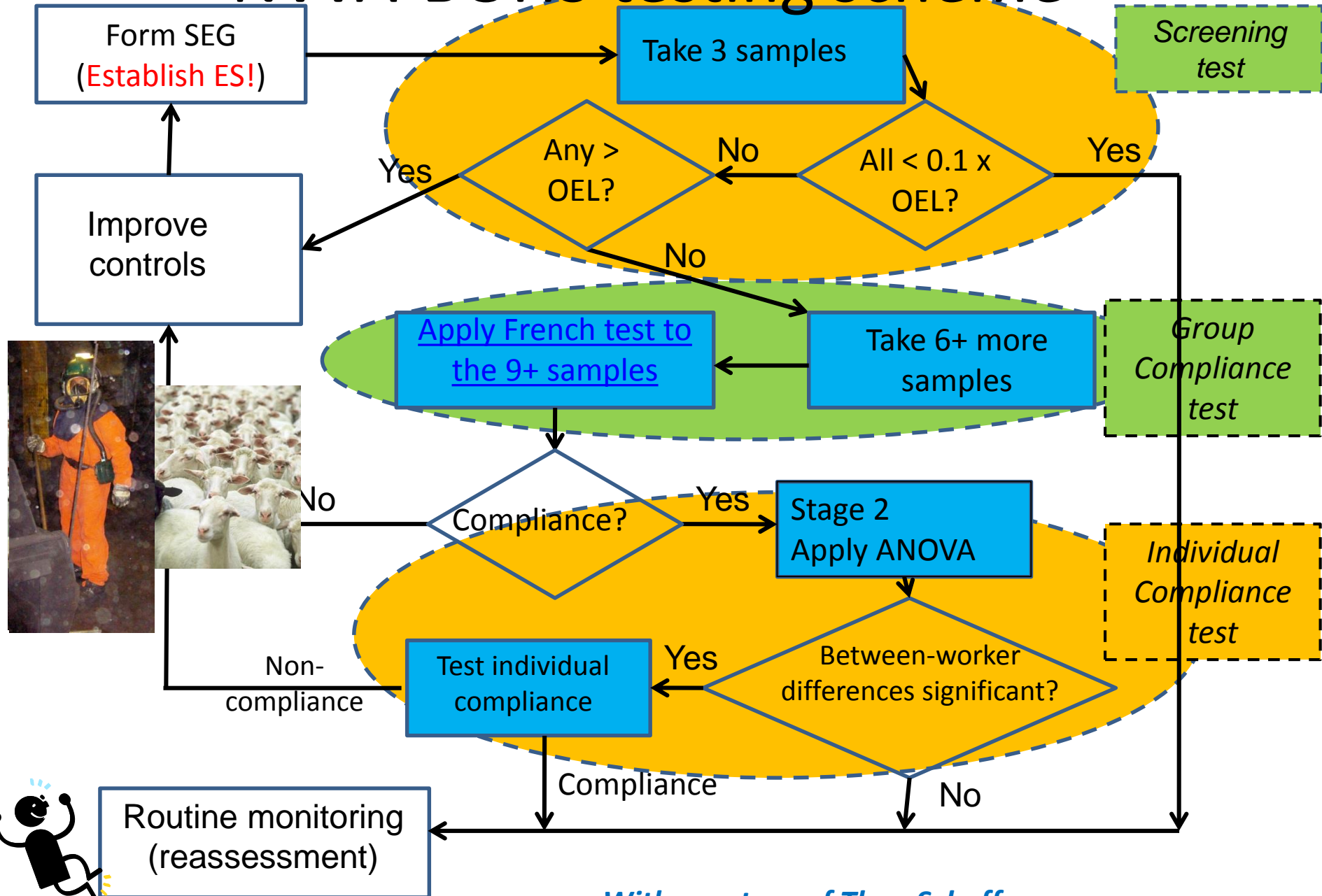
Nederlandse Vereniging voor
Arbeidshygiëne
Postbus 1762,
5602 BT Eindhoven
The Netherlands
www.arbeidshygiene.nl/



Structure of the BOHS/NVvA guidance:

- (1) Form Similarly Exposed Groups (SEGs)
- (2) Preliminary test **Three measurements per SEG** to eliminate groups that obviously comply or obviously fail.
- (3) Group compliance **≥6 more measurements per SEG** non-compliance if, with 70% confidence, $\geq 5\%$ of the exposures exceed the OEL
- (4) If not, do analysis of variance to see if individual differences are important.
- (5) If so, test **individual compliance**
80% of the workers in the SEG must have $< 5\%$ of their exposures $> \text{OEL}$

NVvA-BOHS testing scheme



With courtesy of Theo Scheffers

Case study: company A - formulator

Multinational

- Local plant
- Appr. 135 employees

Personal Air Sampling

- Since 1993: solvents
- According to CEN EN689

Biological monitoring

- Over the years more attention for skin exposure
- Methylhippuric Acid (Xylene)
- Butoxy Acetic Acid (Glycolethers)

Quantitative estimation

- Since 2011: other substances > Stoffenmanager®

Case study: company B - formulator

SME

- Appr. 35 employees

Personal Air Sampling

- Since 1993: solvents
- Not high on agenda
- No periodic measurements according to CEN EN:689
- Since 2013: on agenda again (visit Labour Inspection)

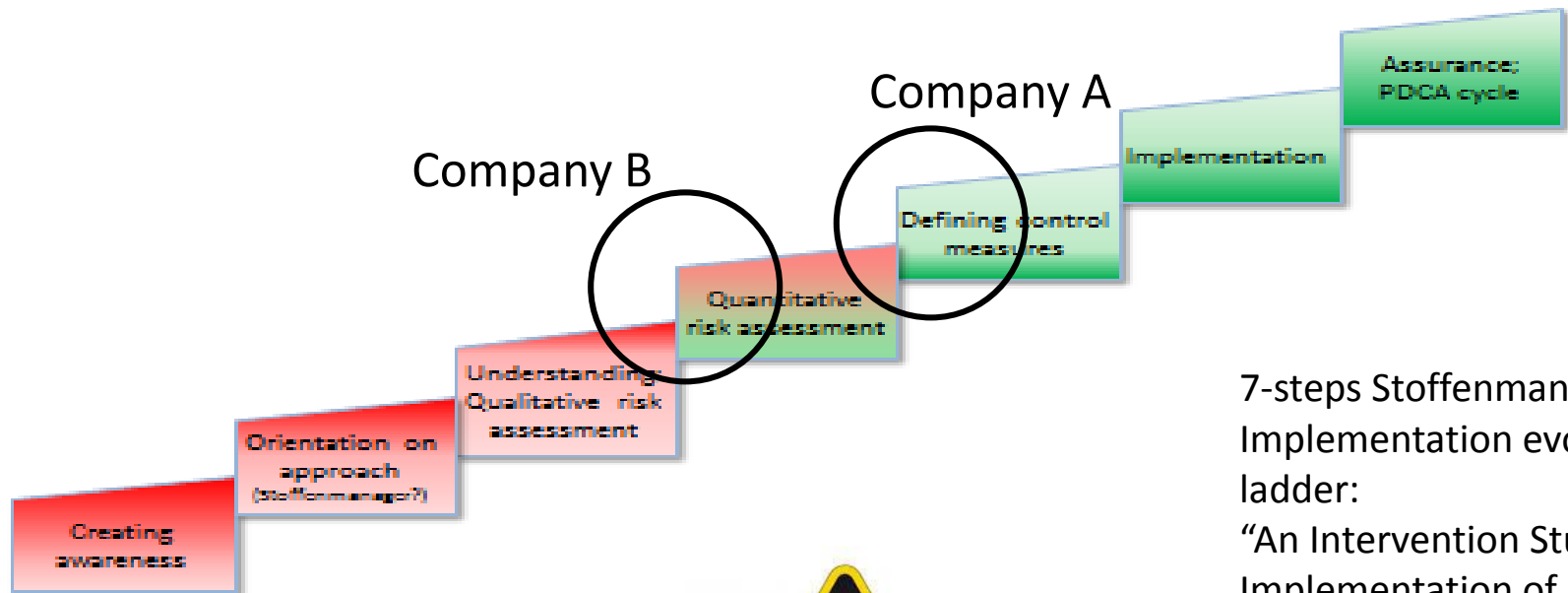
Biological monitoring

- Not indicated

Quantitative estimation

- Since 2013: other substances > Stoffenmanager®

Case studies



7-steps Stoffenmanager®
Implementation evolutionary
ladder:
“An Intervention Study on the
Implementation of Control
Banding in Controlling Exposure
to Hazardous Chemicals in Small
and Medium-sized Enterprises
(2016). Terwoert, J. et al.

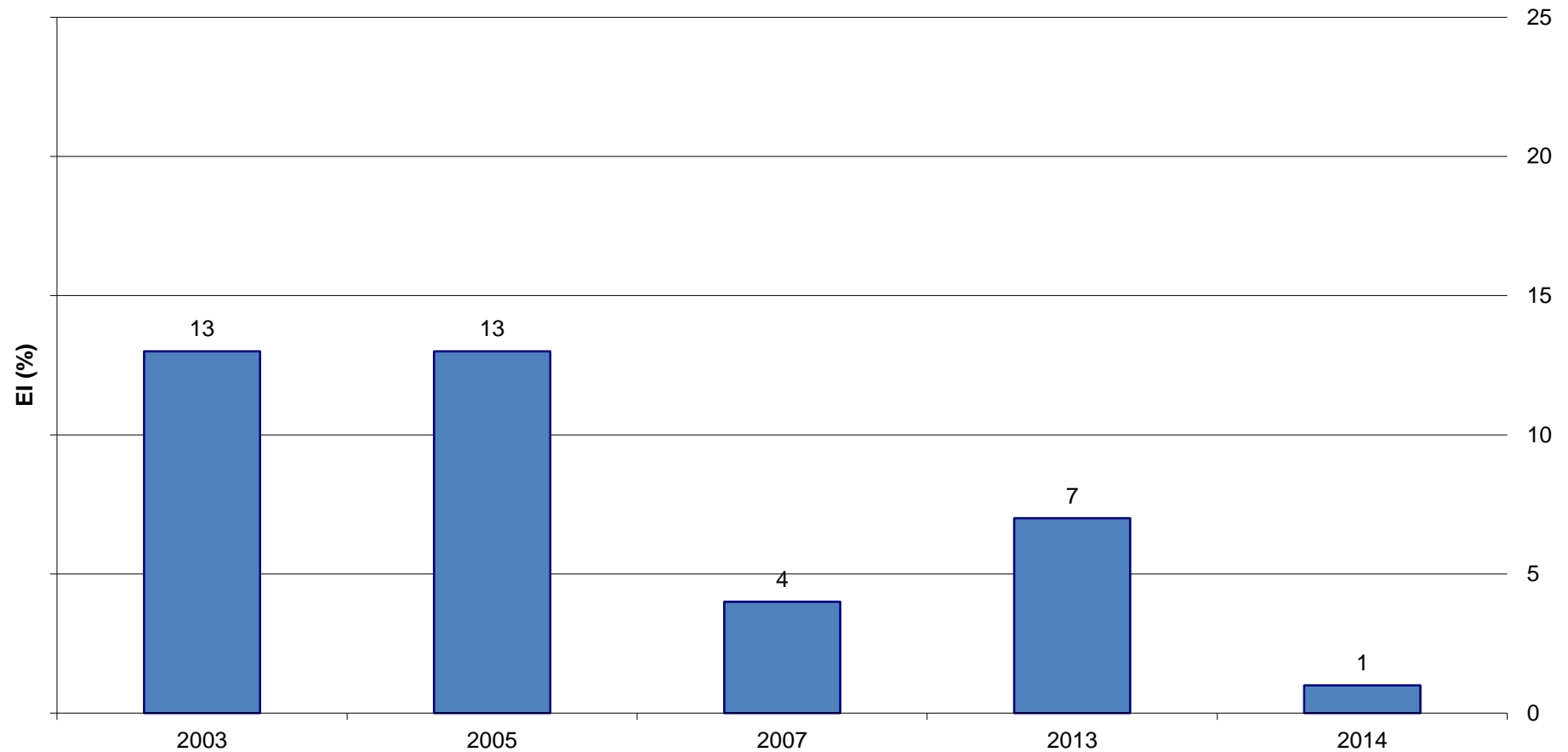


Results: company A – PAS solvents

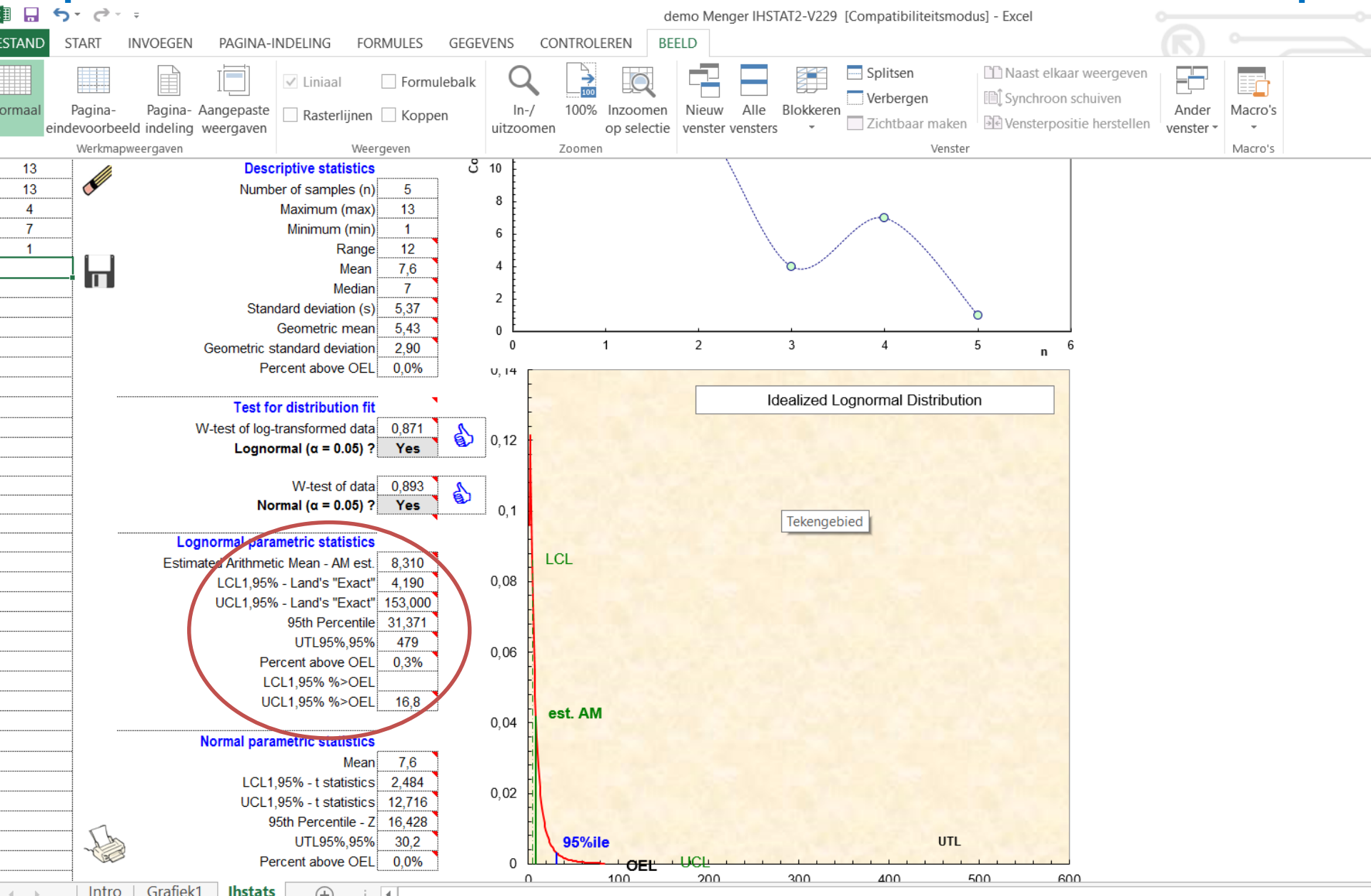
	Total number of SEGs: 19		
	Compliance	No decision	Non-compliance
CEN EN 689	15	1	3
prEN 689	11	5	3
BOHS/NVvA	7	9	3

Results: example one SEG (1)

Mixer waterbased products

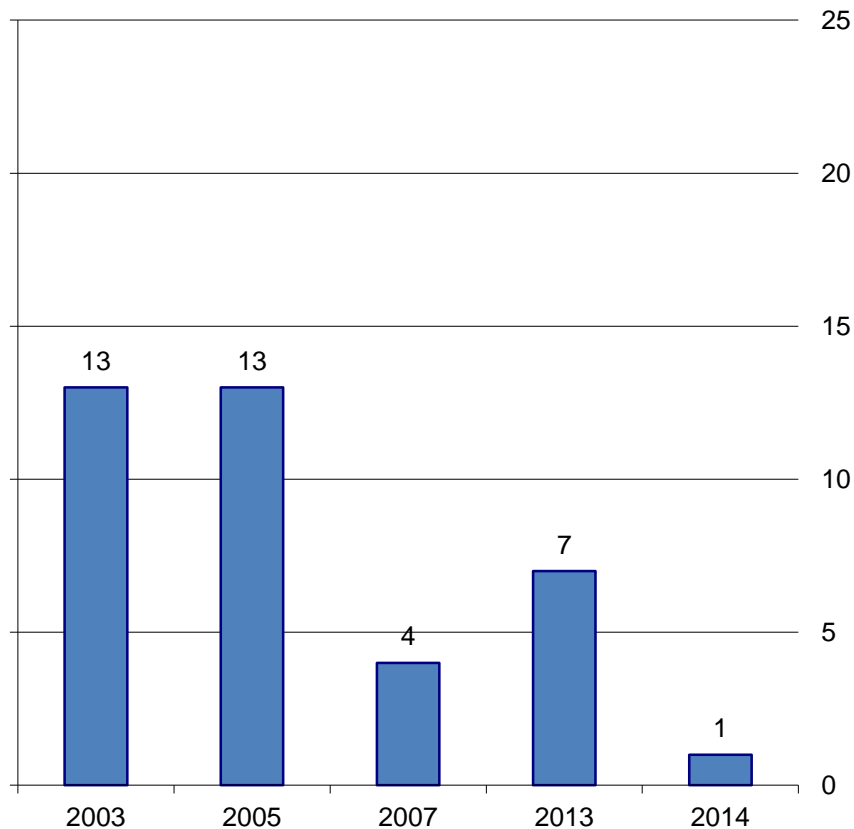


Results: example one SEG (2)



Results: example one SEG (3)

Mixer waterbased products



BOHS/NVvA:

- Group compliance test > UTL95%,70% = 62%
- 4 additional measurements

Draft prEN689:

- all results < 0,2 OELV for 5 exposure measurements
- Compliance

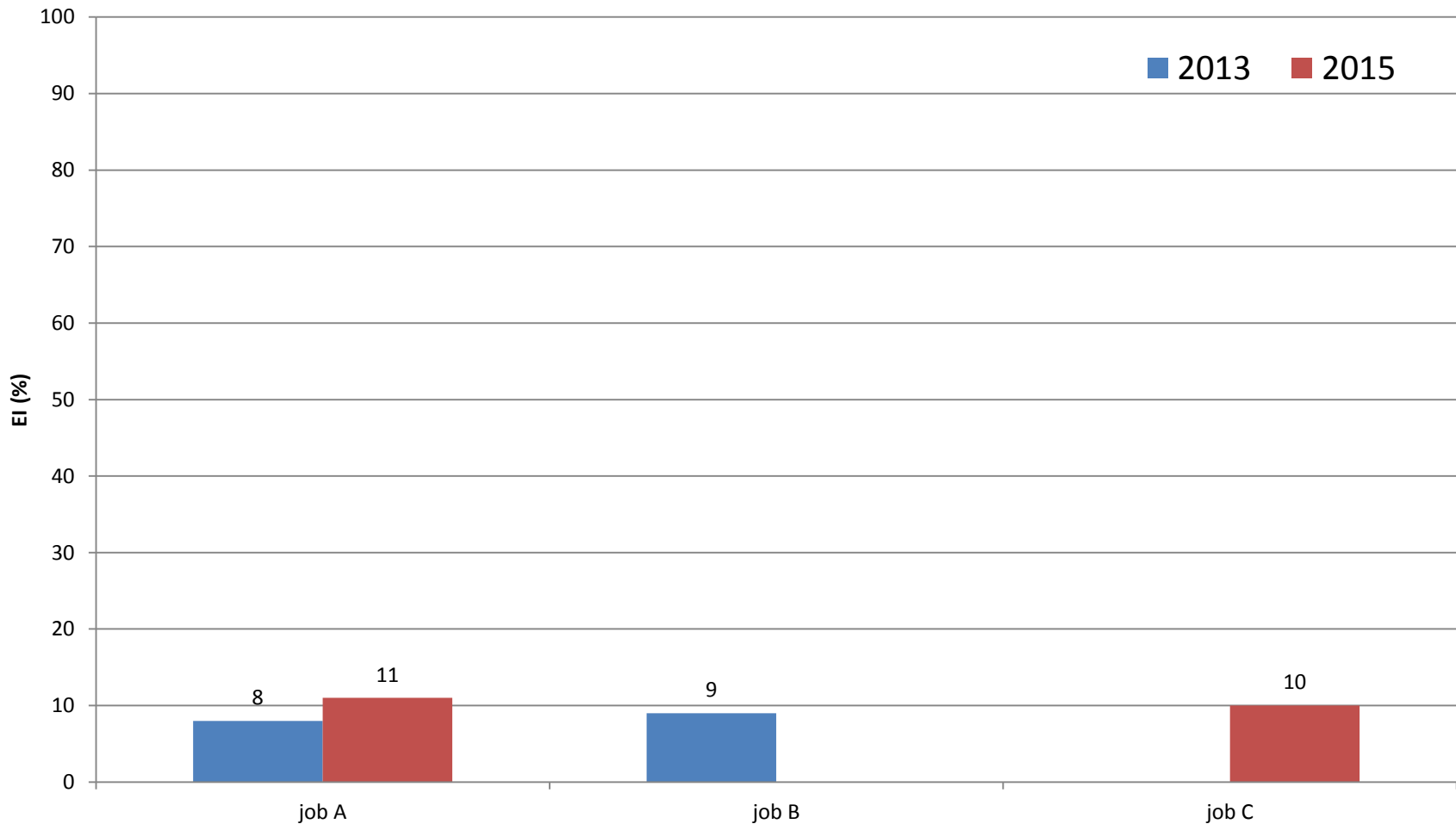
CEN EN 689:

- IHSTAT: control + periodic measurements

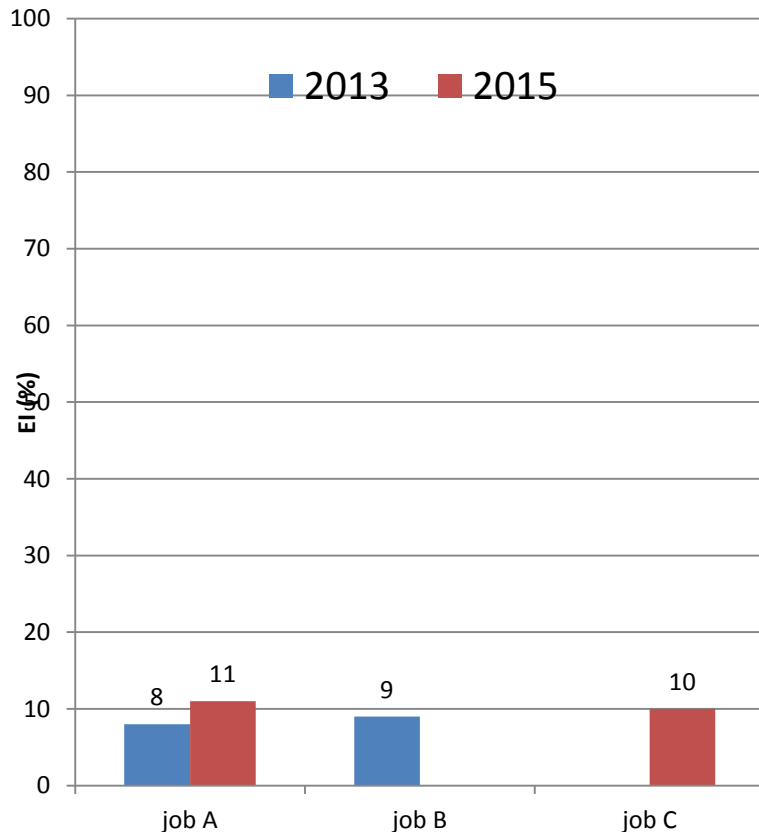
Results: company B – PAS solvents

	Total number of SEGs: 6		
	Compliance	No decision	Non-compliance
CEN EN 689	2	4	-
prEN 689	-	6	-
BOHS/NVvA	-	6	-

Results: example 3 SEGs (1)



Results: example 3 SEGS (2)



BOHS/NVvA:

- No decision
- Take 3 samples per SEG

Draft prEN689:

- No decision
- Take 3 samples per SEG

CEN EN 689:

- Job A, B, C: Compliance

Conclusions

- Ranking more strict: BOHS / NVvA > prEN689 > CEN EN 689
- Screening test: minimum 3 measurements in stead of 1 measurement
 - both draft prEN689 & BOHS / NVvA
 - prEN689 more flexibility in number of measurements (3-5) than BOHS / NVvA (3 or 9+)
- Draft prEN689 pragmatic trade-off between science and measurements costs?
- Final revised EN689:
 - harmonisation
 - BOHS / NVvA guidance?

Thanks!

