



Facility Characterization: Formaldehyde Study Results

AHFA Summit, High Point, NC
August 20, 2025

Travis R. Kline, MEM, BCES
Sr. Principal Toxicologist
Washington, DC



OEL Timelines and Bases

Formaldehyde



- OSHA PEL = 750 ppb (8h TWA)
- ACGIH = 100 ppb (non-enforceable)
- NIOSH = 16 ppb (non-enforceable)
- US Army PHC = 900 ppb
- EU SCOEL = 300 ppb
- 2024 - EPA's Draft Risk Evaluation for Formaldehyde/Draft Human Health Risk Assessment for Formaldehyde (Appendix E): 11 ppb
 - No PPE, 8 hrs/day, 250 d/y, 40-yr employment → TR = 1E-04 (>>95%ile)
 - Chronic Non-Cancer – Exposures in Children (PFTs not biologically meaningful: Age, gender-normalized)
 - OSHA's Key Study: Age of data, lack of worker activity specifics, bias in selection of sites.
 - Key Study inappropriate: EPA BMR POD did not satisfy BMD Modeling
 - 11 ppb – Challenges for quantitation – a single Method (1007); overpredicts up to 9-fold
 - Needs a unified approach for cancer (nasopharyngeal) and noncancer (PF and respiratory system) effects → following WHO, 2010.
 - 9 Republicans, two Democrats: A “de factor ban”



OEL Timelines and Bases

Formaldehyde



- Jan 2, 2025 - EPA's Final TSCA Evaluation:
 - Unreasonable risk in 58 or 63 Conditions of Use (50 = Occupational exposures)
 - Acute: Non-cancer, sensory irritation, skin sensitization (modeling)
 - UF reduced from 10 to 3 (human variability/sensitive individuals)
 - Chronic:
 - PFT in children (1990 study)
 - TR=1E-04; Nasopharyngeal cancer, Epi data, basis for the OEL (3,975 empirical samples)
 - OEV of 108 ppb (133 ug/m³) → 110 ppb OEL
 - Acute STEL₁₅: 170 ppb, sensory irritation (Currently, OSHA STEL = 2,000 ppb)
 - Risk-based values – not proposed for final rulemaking
 - EPA may still consider costs and other non-risk factors (Next Steps?)
 - Technological feasibility (e.g., M/IDLs), availability of alternatives, critical or essential uses



Industry-Representative Facilities



- Century Furniture – Hickory, NC
 - Primarily mixed MDF, some solid wood
 - Larger building
- Sherrill Furniture – Hickory, NC
 - Primarily MDF and Particleboard
 - Older bldg. – 1910 – Low ceilings, challenging air exchange rates and pathways.
- Gat Creek – Berkeley Springs, WV
 - Newer facility with up-to-date air exchanges
 - Only solid wood.
 - No Added Formaldehyde (NAF resin) gluing ops
 - Lacquers and paints ...
- Sauder Woodworking – Archbold, OH
 - Older facility – two separate buildings
 - Uses urea formaldehyde glue in laminating process
 - Sauder St. Bldg: Older with low air flow/exchange rate
 - Myers Rd Bldg: Late 1980's – Higher ceilings, more modern



Formaldehyde Study Structure



- **Characterize Industry Background Formaldehyde**
 - Site walkthrough and interviews with Facility Rep
 - Identify potential fugitive process losses to select locations
 - Sampling locations based on facility layout and maximum number of exposure scenarios.
 - Single day sampling/facility
- **Short-term Max Exposure:** 6 sorbent tube samples/30 mins
 - Orbo 558, Pumps set to 0.5 L/min @ breathing height
- **EPA-Comparable Sampling:**
 - Three synoptically-paired stationary samples and employee-worn badges/8 hrs.
 - Stationary samples: Workstations w/ upper-bound potential exposure.
 - Breathing height, DPNH-impregnated T-119 sampling tubes, pumps set to 0.06 L/min (30 L, total). RL = 0.003 ppb
 - Employee badges: Pragmatic assessment basis
 - Assay 571 badges, breathing height, 7.8L, RL = 10 ppb.
 - Non-smokers, assigned to workstations with stationary samplers.
- SGS Galson, East Syracuse NY and Eurofins Built Environment Testing, Richmond, VA



Study Results



Preliminary Indoor Air Results

Draft - Privileged & Confidential

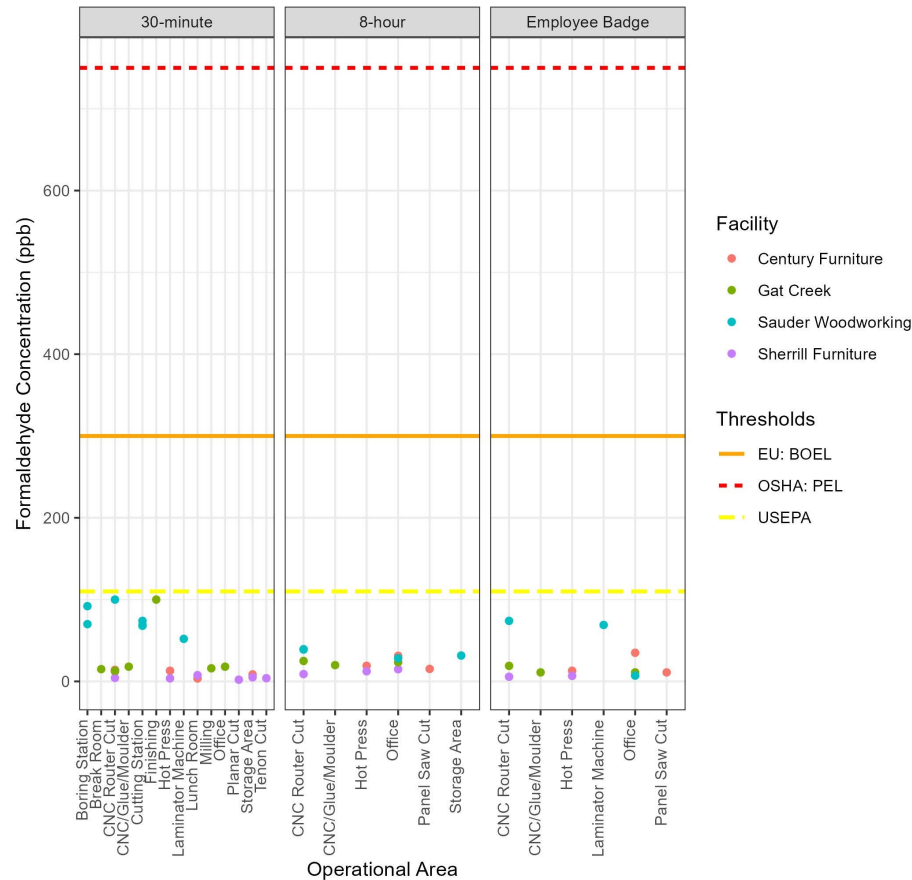


Table 1. Preliminary Formaldehyde Results in Indoor Air

Facility	Workstation	30-minute Sorbent (ppb)	8-hr Sorbent (ppb)	8-hr Badge (ppb)
Century Furniture	Hot press	13	19.1 / 18.8	13 / 12
	CNC Router Cut	14		
	CNC Router Cut	14 / 15		
	CNC Router Cut	12		
	Panel Saw Cut		15.3	11
	Storage	8.6		
	Lunchroom	3.6		
	Office		31.3	35
Sherrill Furniture	Hot Press	3.7 / 6.2	12.4	6.7
	CNC Router Cut	4.3	8.96 / 8.54	5.7 / 5.0
	Tenon Cut	3.9		
	Planar Cut	< 2.1		
	Storage	5.0		
	Lunchroom	7.6		
	Office		14.9	7.2
Gat Creek	CNC Machine	13	25.0 / 25.4	19 / 13
	CNC/Glue/Moulder	18	19.9	11
	Finishing	100		
	Milling	16		
	Break Room	15		
	Office	18 / 20	23.4	11
	Office			
Sauder Woodworking	Cutting Area - Sauder St.	100	38.9 / 39.4	74
	Boring Station - Sauder St.	92		
	Laminator Machine - Sauder St.	52		69
	Boring Station - Myer St.	70		
	Cutting Station - Myer St.	69 / 74 / 68		
	Storage - Sauder St.		31.6	
	Office - Middle St.		< 28.3*	7.1 / 6.0
	Office			

Notes:

Exceeds OSHA PEL of 750 ppb

Exceeds Proposed OEV of 110 ppb

* Result is non-detect. The higher reporting limit at the Sauder facility is due to shorter sampling time, and smaller sample volume, due to the sampling pump running out of battery.

hr: hour

ppb: parts per billion



What's Next?



- No exceedances of the current OEV, suggesting that across the industry, there is low likelihood of pervasive, unacceptable exposure.
- Need for advocacy? OHSA = 750 ppb ...
- Gat Creek Outlier
 - Formaldehyde-free process?
 - 2 additional samples (mid-morning, mid-afternoon)
 - Note from Gat Creek Interview:
 - “The urethane is formaldehyde-free, but we have other stuff with formaldehyde here. We still use some lacquer in our paints and for some touch-up work.”

