

# TDCPP: Clarification of Exposure Issues

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# Exposure Summary

- TDCPP Use:
  - Flame retardant
  - Polyurethane foams
- Primary uses of foams:
  - Autos
  - Furniture
- Large margins of safety (EU RA 2008)
  - >> 2,000 MOS (Margin of Safety)

# Potential TDCPP Exposure Consumers

- Potential exposure routes
  - Inhalation
  - Skin contact (dermal)
  - Hand-to-mouth transfer of dust
  - Dietary
- Published studies have measured TDCPP in indoor air and dust (*1-10*).
- Studies show TDCPP levels in indoor environments very low:
  - Air: 0 - 0.15  $\mu\text{g}/\text{m}^3$
  - Dust: 0.4 - 67 mg/kg (*EU TDCPP RA, 2008*)
    - North American data consistent with this range (13)

# TDCPP Margins-of-Safety Worst Case

- Using EU Authority Conclusions (2008)
- Most recent and most thorough authoritative assessment of TDCPP
- Worst-case example

|                          | Inhalation | Dermal contact | Ingestion (young children only) | Total Consumer Exposure | Total Young Children |
|--------------------------|------------|----------------|---------------------------------|-------------------------|----------------------|
| Daily intake (mg/kg/day) | 0.0011     | 0.0011         | 0.0002                          | 0.0022                  | 0.0024               |
| Ref. Dose (mg/kg/day)    |            |                |                                 | 5.0                     | 5.0                  |
| <b>Ratio (MOS)</b>       |            |                |                                 | <b>2,273</b>            | <b>2,083</b>         |



# Potential TDCPP Exposure

## Inhalation

- EU Risk Assessment worst-case scenario
- $3.8 \mu\text{g}/\text{m}^3$  represents a twenty fold higher concentration than what has actually been measured indoors  $0.15 \mu\text{g}/\text{m}^3$ .
- EU Concluded daily intake from inhalation:  $0.0011 \text{ mg}/\text{kg}/\text{day}$

# Potential TDCPP Exposure

## Dermal

- Not expected to be important exposure route
  - Product designs
  - Barrier fabrics
- Limited published data
- EU Risk Assessment concluded
  - Dermal exposure is insignificant
  - Worst Case - [0.0011 mg/kg/day](#) (*EU TDCPP RA, 2008*)

# Potential TDCPP Exposure

## Dust Ingestion by Young Children

- Children may ingest dust containing TDCPP
- EU Worst-case:
  - 12 mg dust/kg/day ingested by young children
  - 0.0002 mg TDCPP/kg/day (EU TDCPP RA 2008)

# Potential TDCPP Exposure

## Dietary (Food)

- Food is not a significant exposure route
- No published data documenting exposure to food
- TDCPP does not bio-accumulate
- Rapid elimination in the body

# Potential TDCPP Exposure Retention on Foam

- Long-term foam retention studies *(11, 12)*
  - Show flame retardants largely retained
  - Insignificant migration/volatilization
- Potential consumer exposure very low.
- EU stated their exposure estimate may be an over-estimate *(EU TDCPP RA, 2008)*

# Potential TDCPP Exposure

## References

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