Compound	Octan-1-ol	*Data collection sheet*
N°CAS 111-87-5 MW=130.23 $C_8H_{18}O$ 1 ppm = 5.36 mg/m³ at 23°C	**CLP:** not harmonised	

Organisation name	**Baua**	**German IAQ**	**AgBB**	**ANSES**
Risk value name	AGW		NIK (=LCI)	CLI (=LCI)
Risk value (µg/m³)	107 (calculated for 23°C), 106 original AGW	not appointed for octan-1-ol, but for butan-1-ol (CAS 71-36-3): RWI=700 / RWII=2000	500	1100
Risk value (ppb)	20000	not appointed	90 (calculated for 23°C)	210 (calculated for 23°C)
Reference period	subacute	subchronic	subacute	subacute
Year	1999	1994	2003	2003
Key study	MAK-value of 20 ppm was set in 1999 starting from the former MAK-value of 50 ppm for isomeric 2-ethylhexanol, assuming a stronger irritation potential for octan-1-ol. Baua later (2006) confirmed the 20 ppm-value with the results of van Thriel et al. 2003 which yielded self-reported eye irritation for both substances (van Thriel et al.: Physiological and psychological approaches to chemosensory effects of solvents. Toxicol Letters 2003; 261–71). Baua pronounced the more consistent results for 20 ppm of 2-ethylhexanol to support the formerly set 20 ppm value for octan-1-ol.	Based on an EPA-Review (2011 draft) on butan-1-ol (EPA/635/R-11/081A). EPA derived a $BMDL_{05}$ of 12.4 $mg/kg_{bw} \times d$ for developmental effect. Key study was: Sitarek K et al.: Int J Occup Med Environ Health 1994; 7:365–370	Substance-specific derivation of 500 µg/m³, rationale not published	German AGW (OEL) of 106 mg/m³ × 0.01 = 1.06 mg/m³ (1100 µg/m³), key study see Baua
Study type	Exposure chamber testing with male, young and healthy volunteers. Data from 24 subjects (160 experiments for octan-1-ol). Self-reported ratings of adverse health effects used the neurobehavioral test battery of the Swedish performance evaluation system (SPES). Possible ratings on a scale from 0 (not at all) to 5 (very strong). Authors concluded that from all tested substances best results were achieved for 2-ethylhexanol (CAS 104-76-7), mean concentration 22 ppm (1.8–42 ppm).	11–17/group female Wistar Imp: DAK rats with butan-1-ol in drinking water at concentrations of 0.24, 0.8, and 4% estimated as 300, 1,000, 5,000 $mg/ kg_{bw} \times d$		
Species	man	rat		

Duration of exposure in key study	4 h	14 weeks		
Critical effect	self-reported irritation (eyes)	embryonal brain development		
Critical dose value	Read-across from 20 ppm for 2-ethylhexanol	$BMDL_{05}$: 12.4 mg/kg_{bw} × d (LOAEC for butan-1-ol)		
Adjusted critical dose	no adjustment	720 µg/m^3 (butan-1-ol)		
Single assessment factors (see table R.8.6)	no factors used	route to route=0.286 (1/70kg × 20m^3) resorption by inhalation=0.6; UF_H = 10 (general population); UF_A = 4; toxicodynamic = 2.5 → 0.286 × 0.6 × 10 × 4 × 2.5=17.16, no adjustment for study length		
Other effects				

Organisation name	**Reach registrants**
Risk value name	DNEL general population, hazard via inhalation route, systemic effects, long term exposure, value only in the REACH-dossier, not in the "brief profile"
Risk value (µg/m³)	65000
Risk value (ppb)	12.1 (calculated for 23°C)
Reference period	subchronic
Year	
Key study	animal study (study report) from 1966
Study type	animal study: oral, read-across from hexan-1-ol
Species	rat
Duration of exposure in key study	feeding for 5d per week over 90 d
Critical effect	organ weight loss
Critical dose value	NOAEL: 1127 mg/kgbw (male) NOAEL: 1243 mg/kgbw (female)
Adjusted critical dose	65 mg/m^3
Single assessment factors (see table R.8.6)	NOAEC of 980 mg/m^3 after route to route extrapolation and read-across: 1127mg/kgbw × 1/1.15 × kg_{bw} × d/m^3 980/15=65 mg/m^3 UFH = 5 (workers!) UFA = 2 (also included in 1.15) UFS = 1.5 (little effect expected) 5 × 2 × 1.5 = 15 no adjustment for MW (hexan-1-ol=102,18 / octan-1-ol=130.23), factor would be 1.27 no adjustment for 7/5=1.4
Other effects	

Informative:
Absolute odour threshold 15 µg/m^3 (Nagata 2003)
Above odour recognition concentration penetrating aromatic odour
Boiling point of 195 °C (less probable to reach high emission rates)
Indoor air concentrations: Germany (AGOEF 2013, P50 < 1 µg/m^3, P90 < 1 µg/m^3)
In some foods natural occurring substance (low concentrations)
Natural occurring in human volatilome (urine, faeces, skin)
Used as flavouring agent in the U.S.

Compound		Octan-1-ol	*Factsheet*
Parameter	**Note**	**Comments**	**Value / descriptor**
EU-LCI value and status			
EU-LCI value	1	Mass/volume [µg/m^3]	1700
EU-LCI status	2	Draft/final	Final
EU-LCI year of issue	3	Year when the EU-LCI value was issued	2016
General Information			
CLP Index No	4	INDEX	Not assigned
EC No	5	EINECS – ELINCS - NLP	203-917-6
CAS No	6	Chemical Abstracts Service number	111-87-5
Harmonised CLP classification	7	Human health risk-related classification	Not harmonised
Molar mass and conversion factor	8	[g/mol] and [ppm – mg/m^3]	130.23 1 ppm = 5.36 mg/m^3
Key data / database			
Key study, author(s), year	9	Critical study with lowest relevant effect level	van Thriel et al., 2003a
Read-across compound	10	Where applicable	
Species	11	Rat,… human	Human
Route/type of study	12	Inhalation, oral feed, etc.	Inhalation
Study length	13	Days, subchronic, chronic	Subacute
Exposure duration	14	Hours/day, days/week	4h (single)
Critical endpoint	15	Effect(s), site of	Irritation (eye and nose)
Point of departure (POD)	16	LOAEC*L, NOAEC*L, NOEC*L, benchmark dose, etc.	LOAEC
POD value	17	[mg/m^3] or [ppm] or [mg/kg$_{BW}$×d]	6.4 ppm
Assessment factors (AF)	**18**		
Adjustment for exposure duration	19	Study exposure hours/day, days/week	1
Study Length	20	sa→ sc→ c *(R8-5)*	1
Route-to-route extrapolation factor	21		1
Dose-response	22 a	Reliability of dose-response, LOAEL → NOAEL	2
	22 b	Severity of effect *(R 8-6d)*	1
Interspecies differences	23 a	Allometric Metabolic rate *(R8-3)*	1
	23 b	Kinetic + dynamic	1
Intraspecies differences	24	Kinetic + dynamic Worker - general population	10
AF (sensitive population)	25	Children or other sensitive groups	1
Other adjustment factors Quality of whole database	26	Completeness and consistency Reliability of alternative data *(R8-6 d,e)*	1

Result			
Summary of assessment factors	27	Total Assessment Factor (TAF)	20
POD/TAF	28	Calculated value (µg/m³ and ppb)	1715 µg/m³ 320 ppb
Molar adjustment factor	29	Used in read-across	
Rounded value	30	[µg/m³]	1700
Additional comments	31		
Rationale section	32		

There were only limited data for octan-1-ol. For indoor-air exposure, only irritation seems to be the relevant endpoint. Irritation is a common feature of all higher aliphatic alcohols. Self-reported irritation was documented in an exposure chamber study with healthy young men in a laboratory room. Being aware of the limitations discussed below, the POD was taken from this study.

Point of departure (POD)

The chamber study simultaneously exposed 4 subjects (single blind) for 4 hours at a time to either constant or alternating concentrations (whole study population: 24 subjects). Results were analysed and reported from different points of view by Seeber et al. 2002 [4], van Thriel et al. 2003a [5] and van Thriel et al. 2003b [6]. Several chemicals, including octan-1-ol, were tested either at a 'low' and constant concentration or at a 'high' concentration (starting with a maximum and then 4x decreasing/increasing concentrations) during each 4 hour-test.

All results are based on self-reported ratings of effects and perceptions. The authors used the neurobehavioral test battery of the Swedish Performance Evaluation System (SPES). The data stem from 24 subjects; 12 subjects reported sensitivity to chemicals/odours, and 12 subjects reported no sensitivity to chemicals/odours. The authors aimed to detect the perception of irritation, odour and annoyance as independent factors, independent of personal attitude.

The POD of 6.4 ppm was based on van Thriel et al. 2003a [5], which focused on results for octan-1-ol (and isopropanol) and found that 'reports of sensory irritation were elevated exclusively during the high 1-octanol exposure'. 'Irritation' was a combined score for eye and nasal irritation, and the reported level was rather low (baseline-corrected, max. 10 % of the 100 % scale range for irritation at the beginning of the 'high' exposure). For octan-1-ol, 'low' exposure was a constant 0.1 ppm concentration, and 'high' exposure was a sinusoidal concentration changing between 0.4 and 12.5 ppm (with a mean of 6.4 ppm). In addition, a significant and dose-dependent reduction in nasal flow was described for 'high' exposure to octan-1-ol (van Thriel et al. 2003b [6]). One limitation of the study is that only subjective perception of irritation was reported. Because of the low octan-1-ol absolute odour threshold of 0.0027 ppm [3] (15 µg/m³), an annoying odour may have been reported as 'irritation'.

Assessment factors (AF)

As the effect (low and only self-reported sensory irritation) seen at the POD is marginal, a low AF of 2 is applied to account for LOAEC to NOAEC extrapolation (Note 22a), see [1]). No AFs are applied for study length or exposure duration, since sensory irritation develops within minutes. Further, no AFs were necessary for route-to-route and interspecies extrapolations, since the effect is local in the airways and the POD is based on inhalation exposure of humans. However, since the chamber exposure studies were carried out with a limited number of healthy volunteers, an AF of 10 is used to account for variability in the general population (intraspecies factor). This factor is thought to be sufficient for sensitive populations; overall, the EU-LCI can be regarded as conservative.

The total assessment factor (TAF) is 2×10=20. The calculated EU-LCI value for octan-1-ol is POD/TAF = 6.4 ppm/20=0.32 ppm (1715 µg/m³ at 23 °C). After rounding to hundreds [1], the EU-LCI-value is 1700 µg/m³.

The EU-LCI is similar to the results of an animal bioassay with octan-3-ol (an aliphatic alcohol with presumed similar irritation potency), where Korpi et al. determined an RD_{50} value of 1 359 mg/m³ with mice [2]. The authors proposed a recommended indoor air level (RIL) of 1 000 µg/m³ for octan-3-ol by division of RD_{50}/1.333. Starting from the same RD_{50}, Wolkoff [7] estimated a LOAEL of 109 mg/m³ according to $LOAEL=10^{(\log RD_{50}-0.77)\times 1/1.16}$ and proposed a NOAEL of 2 mg/m³ by further applying an AF of 50.

References

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[3] Nagata Y: Measurement of Odour Threshold by Triangle Odor Bag Method. 2003

[4] Seeber A, van Thriel C, Haumann K, Kiesswetter E, Blaszkewicz M, Golka K: Psychological reactions related to chemosensory irritation. Int Arch Occup Environ Health 2002;75:314-25

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[6] van Thriel C, Seeber A, Kiesswetter E, Blaszkewicz M, Golka K, Wiesmüller GA: Physiological and psychological approaches to chemosensory effects of solvents (review). Toxicology Letters 2003;140/141:261-71 (van Thriel et al., 2003b)

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