

**The late notification of  
DCOIT for PT 8,  
an important contribution to the development of  
full organic wood preservatives for use class 4**

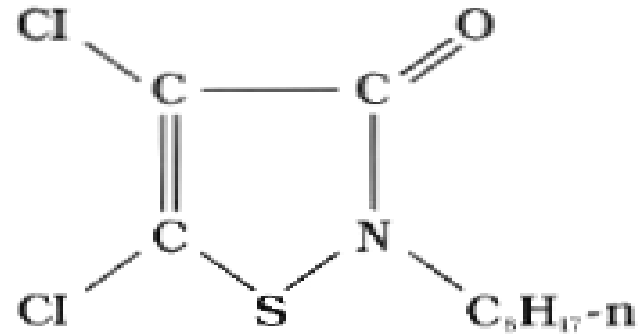
---

**Dr. Michael Pallaske, Cost Action E37, Poznan, 08th to 09th May, 2006**

## DCOIT : basic informations - identification

chemical name : 4,5-dichloro-2-n-octyl-4-isothiazolin-3-one

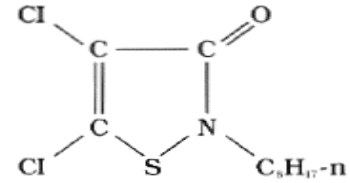
chemical structure :



C.A.S. reg. no. : 643 59 – 87 – 5

EINECS : 2648438

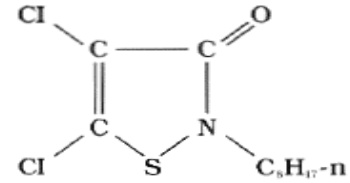
## DCOIT : basic informations - physical properties



### physical data :

spec. gravity	:	1.27 g/cm <sup>3</sup> at 25°C
melting point	:	41.1 – 41.7 °C
boiling point	:	> 300 °C where degradation occurs
vapour pressure of the a.i.	:	9.8 x 10 <sup>-6</sup> hPa at 25°C
octanol/water partition coeff.	:	Log K <sub>ow</sub> = 2.8 at pH 7 and 23°C

## DCOIT : basic informations - solubility



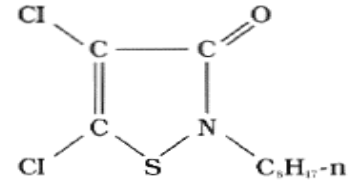
### solubility in :

<b>toluene</b>	<b>:</b>	<b>ca. 75%</b> at room temperature
<b>xylene</b>	<b>:</b>	<b>ca. 68%</b> at room temperature
<b>cyclohexane</b>	<b>:</b>	<b>ca. 54%</b> at room temperature
<b>hexane</b>	<b>:</b>	<b>ca. 13%</b> at 10°C
<b>isobutanol</b>	<b>:</b>	<b>ca. 47%</b> at room temperature
<b>white spirit</b>	<b>:</b>	<b>ca. 20%</b> at room temperature
<b>ethyl acetate</b>	<b>:</b>	<b>ca. 32%</b> at 10°C
<b>water</b>	<b>:</b>	<b>4.26 ppm</b> at pH 5 and 20°C <b>3.47 ppm</b> at pH 7 and 20°C

## The late notification of DCOIT ...

### DCOIT : efficacy - MIC-values

**MIC-values** (via two-fold serial dilution broth tests) :



### Bacteria

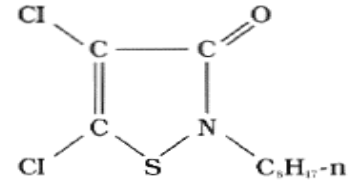
- *Escherichia coli* : 16 ppm
- *Pseudomonas aeruginosa* : 16 ppm
- *Staphylococcus aureus* : 4 ppm

### Fungi

- *Aspergillus niger* : 0.1 ppm
- *Aureobasidium pullulans* : 0.8 ppm
- *Candida albicans* : 5.0 ppm
- *Alternaria alternata* : 0.5 ppm

## The late notification of DCOIT ...

### DCOIT : efficacy - wood destroying fungi



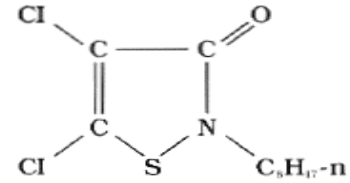
**toxic values** (according EN 113) :

test fungus (strain)	unaged	after EN 84 (leached)	after EN 73 (evaporative aged)
	retention kg/m <sup>3</sup> a.i.	retention kg/m <sup>3</sup> a.i.	retention kg/m <sup>3</sup> a.i.
<b>Coniophora puteana</b> (BAM 15)	0.15 ... 0.30	0.57 ... 1.17	1.20 ... 1.45
<b>Coriolus versicolor</b> (CTB 863A)	< 0.15	< 0.15	0.59 ... 1.15
<b>Gloeophyllum trabeum</b> (BAM 109)	0.31 ... 0.58	0.16 ... 0.31	0.62 ... 1.22
<b>Poria placenta</b> (FPRL 280)	0.30 ... 0.59	0.57 ... 1.12	0.63 ... 1.24

## The late notification of DCOIT ...

### DCOIT : efficacy - wood destroying fungi

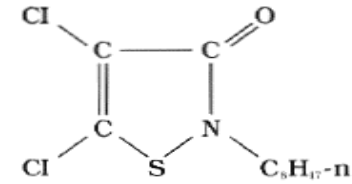
**toxic thresholds (soil block)** (according ASTM D-1413 soil block test) :



test fungus	wood species	toxic threshold
		retention kg/m <sup>3</sup> a.i.
<b>Poria incrassata</b>	southern yellow pine	<b>0.37</b>
<b>Coriolus versicolor</b>	southern yellow pine	<b>&lt; 0.42</b>
<b>Gloeophyllum trabeum</b>	southern yellow pine	<b>0.37</b>
<b>Poria placenta</b>	southern yellow pine	<b>0.50</b>

## The late notification of DCOIT ...

### DCOIT : efficacy - wood destroying fungi



above ground mitre tests :

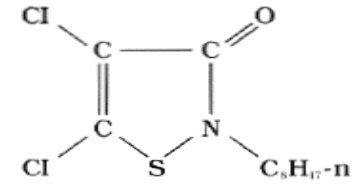
treating solution concentration (as % a.i.)	treatment method	average rating
untreated controls	southern yellow pine	0
0.01	pressure	8.6
0.05	pressure	10.0
0.075	pressure	10.0
0.1	pressure	10.0
0.2	pressure	10.0
0.05	dipping	8.2
0.1	dipping	10.0
0.25	dipping	9.8
0.5	dipping	10.0
1.0	dipping	10.0

after 4.5 years of exposure at MSU



## The late notification of DCOIT ...

### DCOIT : efficacy - wood destroying fungi



above ground L-joint tests :

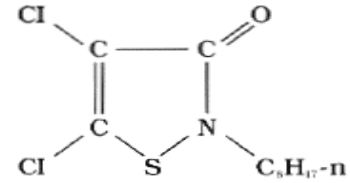
preservative	treatment method	retention kg/m <sup>3</sup> a.i.	average decay rating
untreated control	-	-	5.3
Kathon 925	pressure	0.05	5.5
Kathon 925	pressure	0.20	7.3
Kathon 925	pressure	0.42	9.8
Kathon 925	pressure	1.80	10.0
PCP	pressure	0.5	2.3
PCP	pressure	2.5	8.3
PCP	pressure	5.0	10.0
Kathon 925	dipping	0.5 %	5.9
PCP	dipping	5.0 %	7.6

after 8 years of exposure at MSU

## The late notification of DCOIT ...

### DCOIT : efficacy - wood destroying fungi

a.i.-stability in above ground L-joint tests :



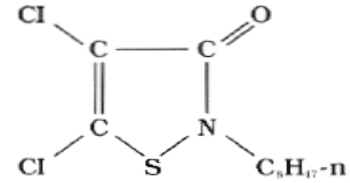
solution concentration (% a.i.)	initial calculated retention	biocide remaining kg/m <sup>3</sup> a.i.
0.1 %	0.50 kg/m <sup>3</sup>	0.40 kg/m <sup>3</sup>
0.1 %	0.35 kg/m <sup>3</sup>	0.40 kg/m <sup>3</sup>
0.1 %	0.35 kg/m <sup>3</sup>	0.32 kg/m <sup>3</sup>

after 4 years of exposure at MSU

## The late notification of DCOIT ...

### DCOIT : efficacy - soft rot fungi

in-ground field tests (formulated DCOIT) :



solution concentration (% a.i.)	retention kg/m <sup>3</sup> a.i.	rating
0.3 %	1.28 kg/m <sup>3</sup>	8.4 in Dorman

after approx. 10 years of exposure at MSU

## The late notification of DCOIT ...

### DCOIT : effective and low environmental impact

