

BASISCURSUS GEVELTECHNIEK 2023
MODULE 3 BOUWFYSICA
OEFENINGEN



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OEFENING 1: 1D U-waarde

LAAG	DIKTE (CM)	LAMBDA (W/mK)	Kleur
Pleister	1	0.3	129
SNELBOUWSTEEN	19	0.220	132
ROTSWOL ISOLATIE	15	0.04	131
PARAMENT	9	0.9	180

a) handberekening: U-waarde

(oplossing 0.203 W/m²K)



b) Trisco2D

Trisco2D - oefening2a.tr2

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Image

Grid

Blocks

Colours

No.	Col.	Xmin	Xmax	Ymin	Ymax
1	170	0	1	0	1
2	129	0	1	1	9
3	131	0	1	9	31
4	124	0	1	31	39
5	174	0	1	39	40

No.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	ϵ_1 / ϵ_2 [- / -]	λ [W/mK]	θ [°C]	h [W/m²K]	q [W/m²]
124	MATERIAL				plywood 500 kg/m³		0.130			
129	MATERIAL				gypsum 900 kg/m³		0.300			
131	MATERIAL				insulation 0.040 W/mK		0.040			
170	BC_SIMPL	HE			exterior			0.0	25.00	
174	BC_SIMPL	LI	LI		interior (room) horizontal heat flow			20.0	7.70	

No.	ΔX [mm]	ΔY [mm]
0-1	1000.000	10.000
1-2		1.000
2-3		1.500
3-4		2.250
4-5		0.250
5-6		0.250
6-7		2.250
7-8		1.500
8-9		1.000
9-10		1.000
10-11		1.500
11-12		2.250
12-13		3.375
13-14		5.063
14-15		7.594
15-16		11.391
16-17		17.086
17-18		25.629
18-19		38.443
19-20		11.670
20-21		11.670
21-22		38.443
22-23		25.629
23-24		17.086



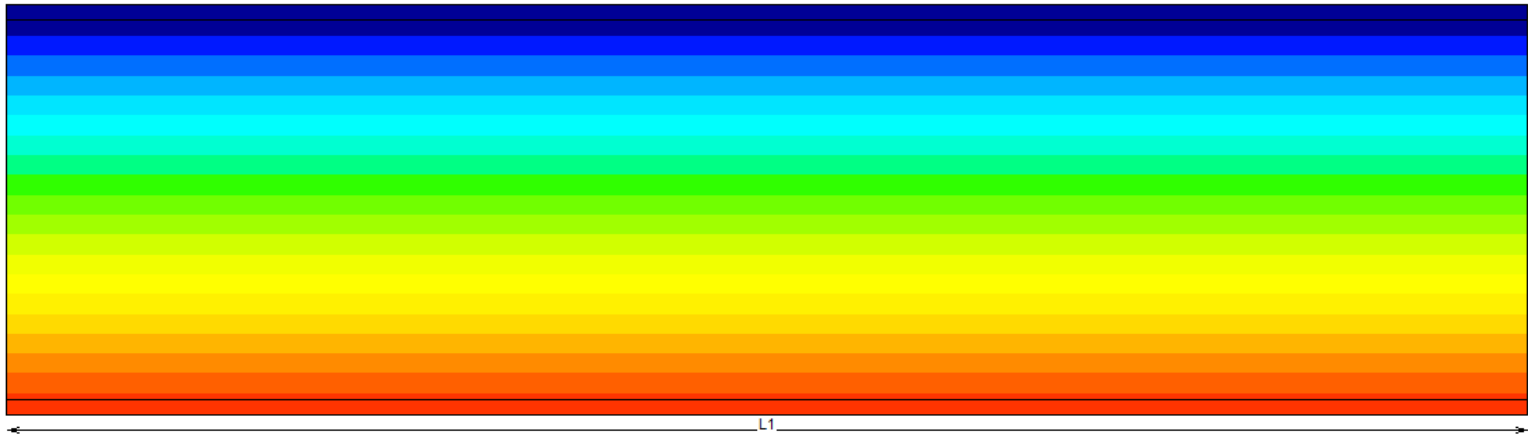
OEFENING 2a: 2D U-waarde

LAAG	DIKTE (CM)	LAMBDA (W/mK)	Kleur
GIPSKARTON	1	0.3	129
MINERALE WOL	25	0.04	131
HOUTVEZELPLAAT	1	0.13	124

a) Bereken de U-waarde met Trisco2D (en controleer resultaat met handberekening)



OEFENING 2a: 2D U-waarde



$$U_{eq} = Q / ((\theta_i - \theta_e) * L1)$$

$$Q = 3.063 \text{ W/m}$$

$$\theta_i = 20^\circ\text{C}$$

$$\theta_e = 0^\circ\text{C}$$

$$L1 = 1 \text{ m}$$

$$U_{eq} = 0.153 \text{ W}/(\text{m}^2 \cdot \text{K})$$



OEFENING 2b: 2D U-waarde

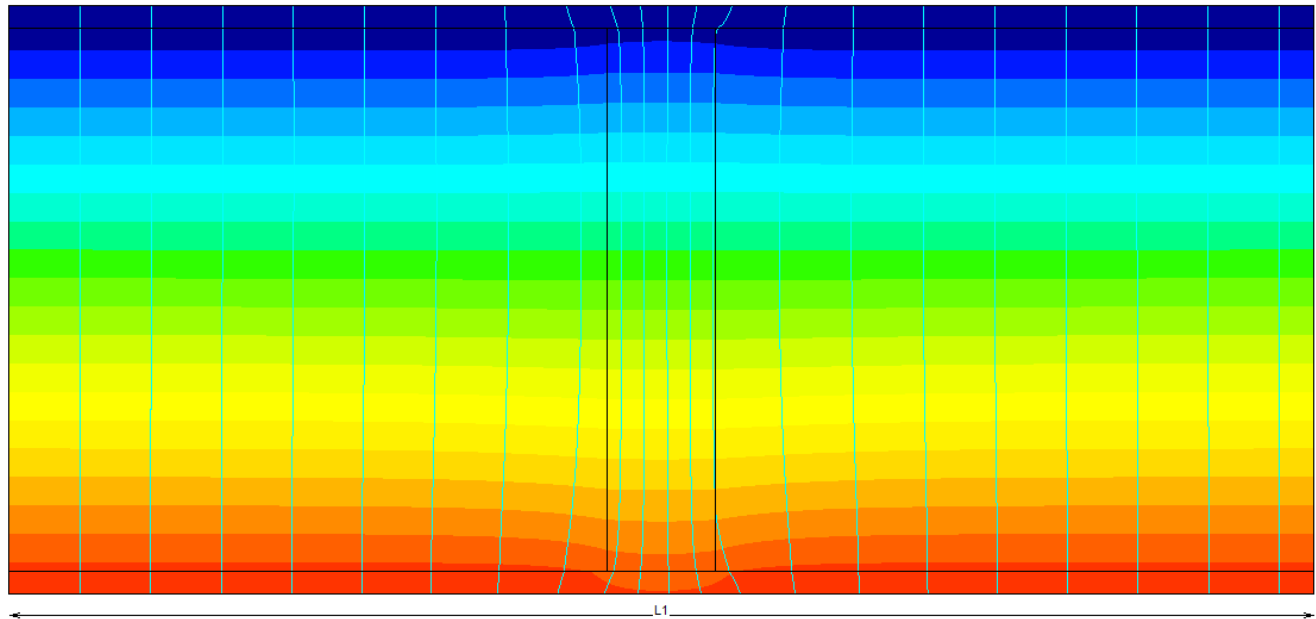
LAAG	DIKTE (CM)	LAMBDA (W/mK)	Kleur
GIPSKARTON	1	0.3	129
MINERALE WOL	25	0.04	131
HOUTEN STUD (5CM OP HOH 60CM)	25	0.13	15
HOUTVEZELPLAAT	1	0.13	124

a) Stap 1D

b) Stap 2: 2D (discontinuïteit)



OEFENING 2b: 2D U-waarde



$$U_{eq} = Q / ((\theta_i - \theta_e) * L1)$$

$$Q = 2.148 \text{ W/m}$$

$$\theta_i = 20^\circ\text{C}$$

$$\theta_e = 0^\circ\text{C}$$

$$L1 = 0.6 \text{ m}$$

$$U_{eq} = 0.179 \text{ W}/(\text{m}^2 \cdot \text{K})$$



OEFENING 2c: 2D U-waarde

LAAG	DIKTE (CM)	LAMBDA (W/mK)	Kleur
GIPSKARTON	1	0.3	129
MINERALE WOL	25	0.04	131
HOUTEN STUD (5CM OP HOH 60CM)	25	0.13	15
METAAL (5MM BEIDE ZIJDEN HOUT)	25	50	13
HOUTVEZELPLAAT	1	0.13	124

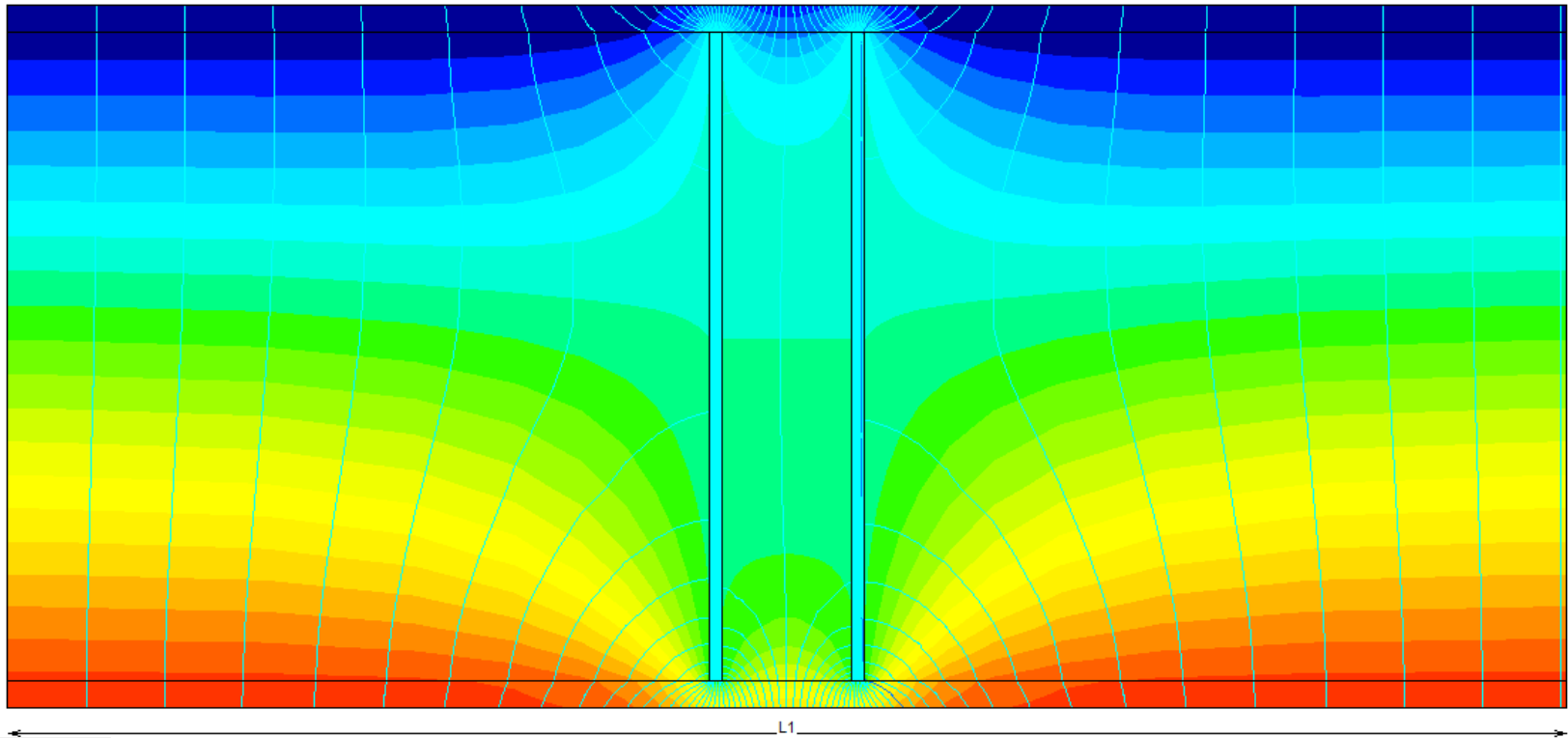
a) Stap 1D

b) Stap 2: 2D (discontinuïteit)

c) Stap 3: 2D (kortsluit-effect)



OEFENING 2c: 2D U-waarde



$$U_{eq} = Q / ((\theta_i - \theta_e) * L1)$$

$$Q = 6.406 \text{ W/m}$$

$$\theta_i = 20^\circ\text{C}$$

$$\theta_e = 0^\circ\text{C}$$

$$L1 = 0.6 \text{ m}$$

$$U_{eq} = 0.534 \text{ W/(m}^2\cdot\text{K)}$$



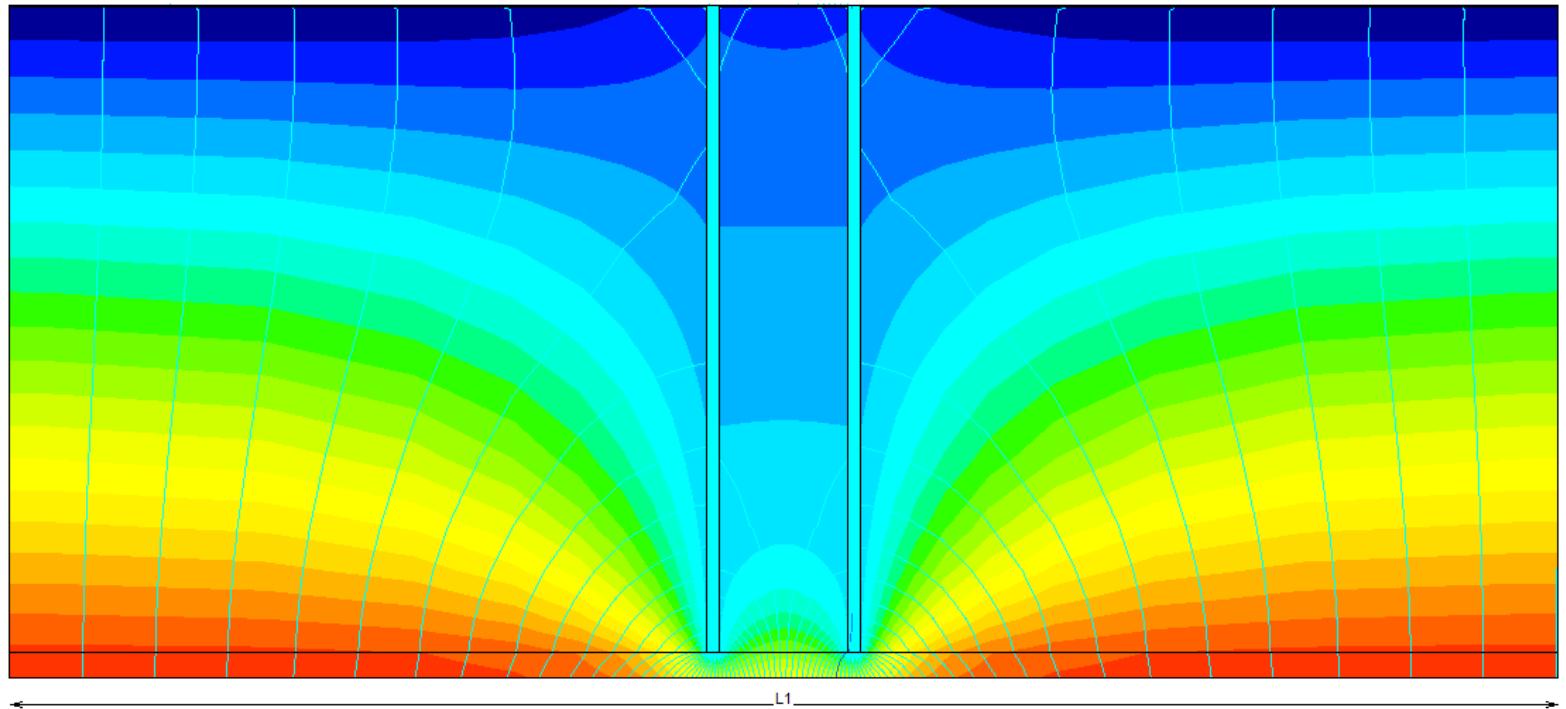
OEFENING 2d: 3D U-waarde

LAAG	DIKTE (CM)	LAMBDA (W/mK)	Kleur
GIPSKARTON	1	0.3	129
MINERALE WOL	25	0.04	131
HOUTEN STUD (5CM OP HOH 60CM)	25	0.13	15
METAAL (5MM BEIDE ZIJDEN HOUT)	25	50	13
METAALPLAAT	0.1	50	13

- a) Stap 1D**
- b) Stap 2: 2D (discontinuïteit)**
- c) Stap 3: 2D (kortsluit-effect)**
- d) Stap 4: 3D (koel-vin effect)**



OEFENING 2d: 3D U-waarde



$$U_{eq} = Q / ((\theta_i - \theta_e) * L1)$$

$$Q = 7.900 \text{ W/m}$$

$$\theta_i = 20^\circ\text{C}$$

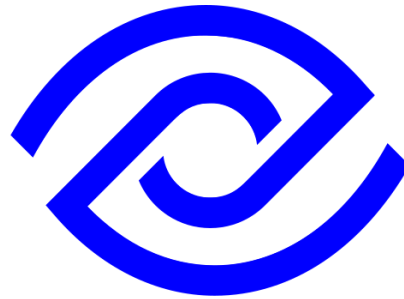
$$\theta_e = 0^\circ\text{C}$$

$$L1 = 0.6 \text{ m}$$

$$U_{eq} = 0.658 \text{ W}/(\text{m}^2.\text{K})$$



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