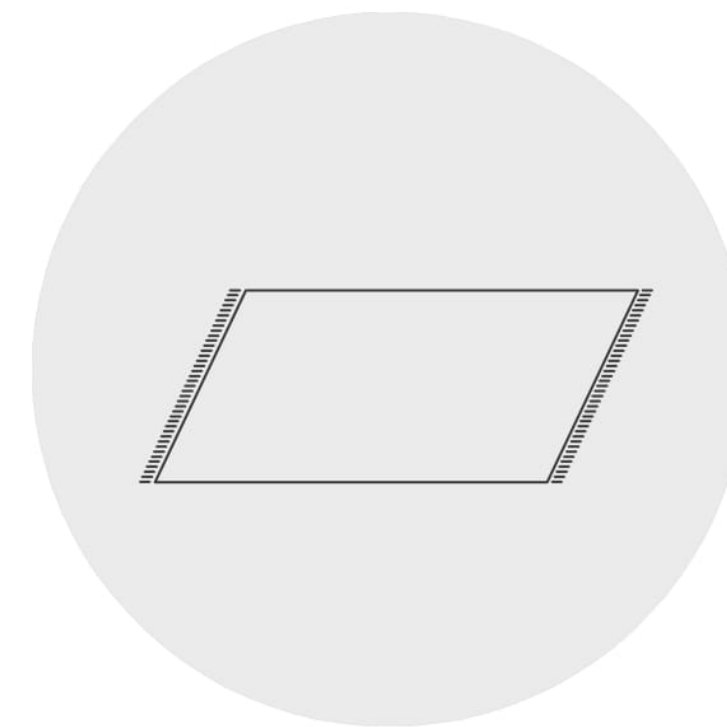
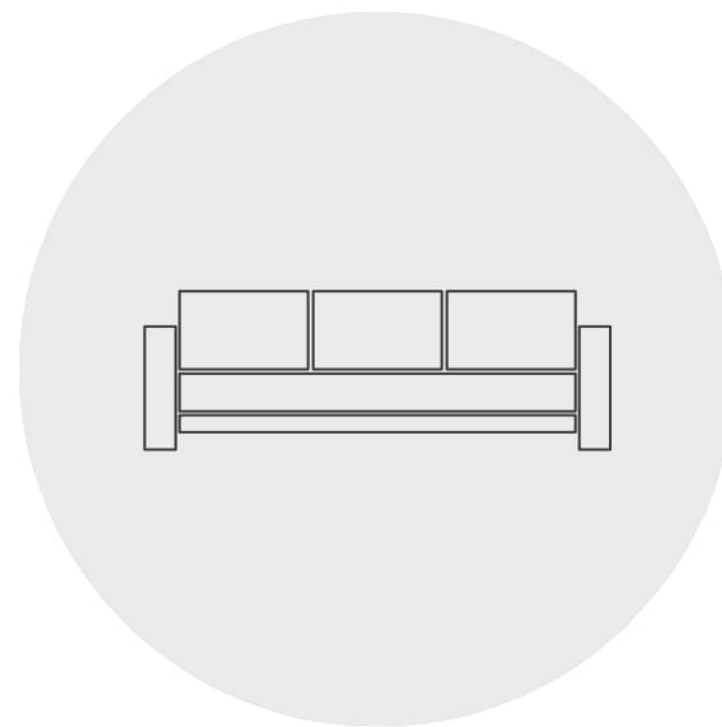
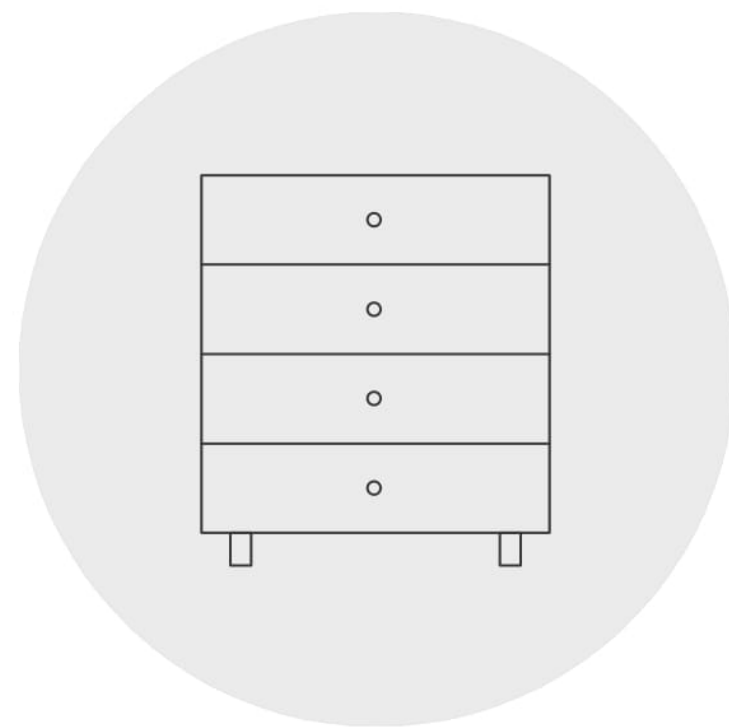


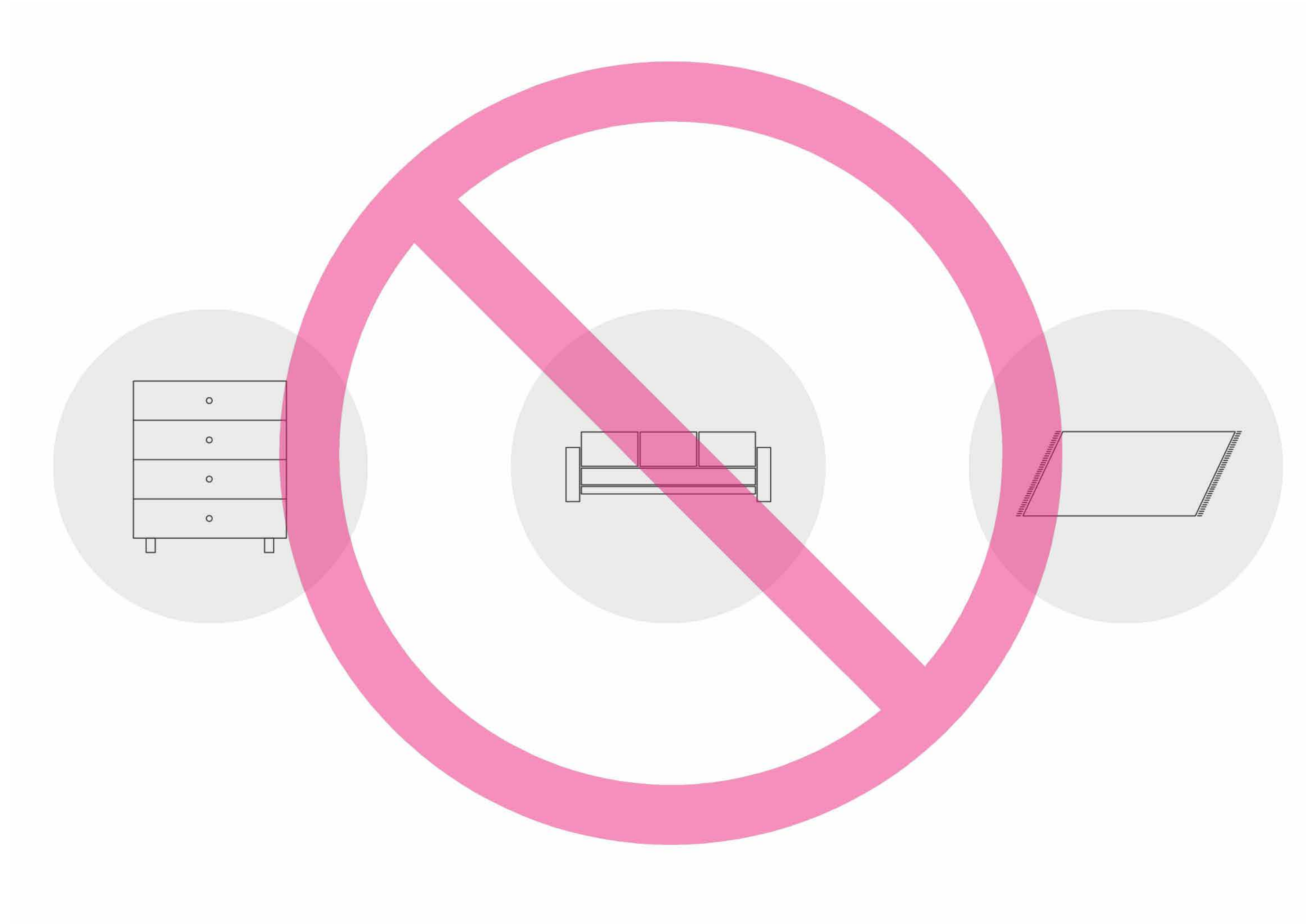
# Materjalide mõju tervisele

Mirell Ülle  
Bakalaureusetöö  
Sisearhitektuuri osakond  
Eesti Kunstiakadeemia

# Isiklik kogemus



# Isiklik kogemus



**Lõputöö jaguneb**

**Teoreetiline**

Kemikaalid

Inimene

# Lõputöö jaguneb

**Teoreetiline**

Kemikaalid

Inimene

**Praktiline**

Ruum

Materjalid

# Lõputöö jaguneb

**Teoreetiline**

Kemikaalid

Inimene

**Praktiline**

Ruum

Materjalid

**Väljund**

Näitus

## Keemiatööstus ja tervis

---

Keemiatööstus 110 aastat

## Keemiatööstus ja tervis

Terviseriskid 20 aastat

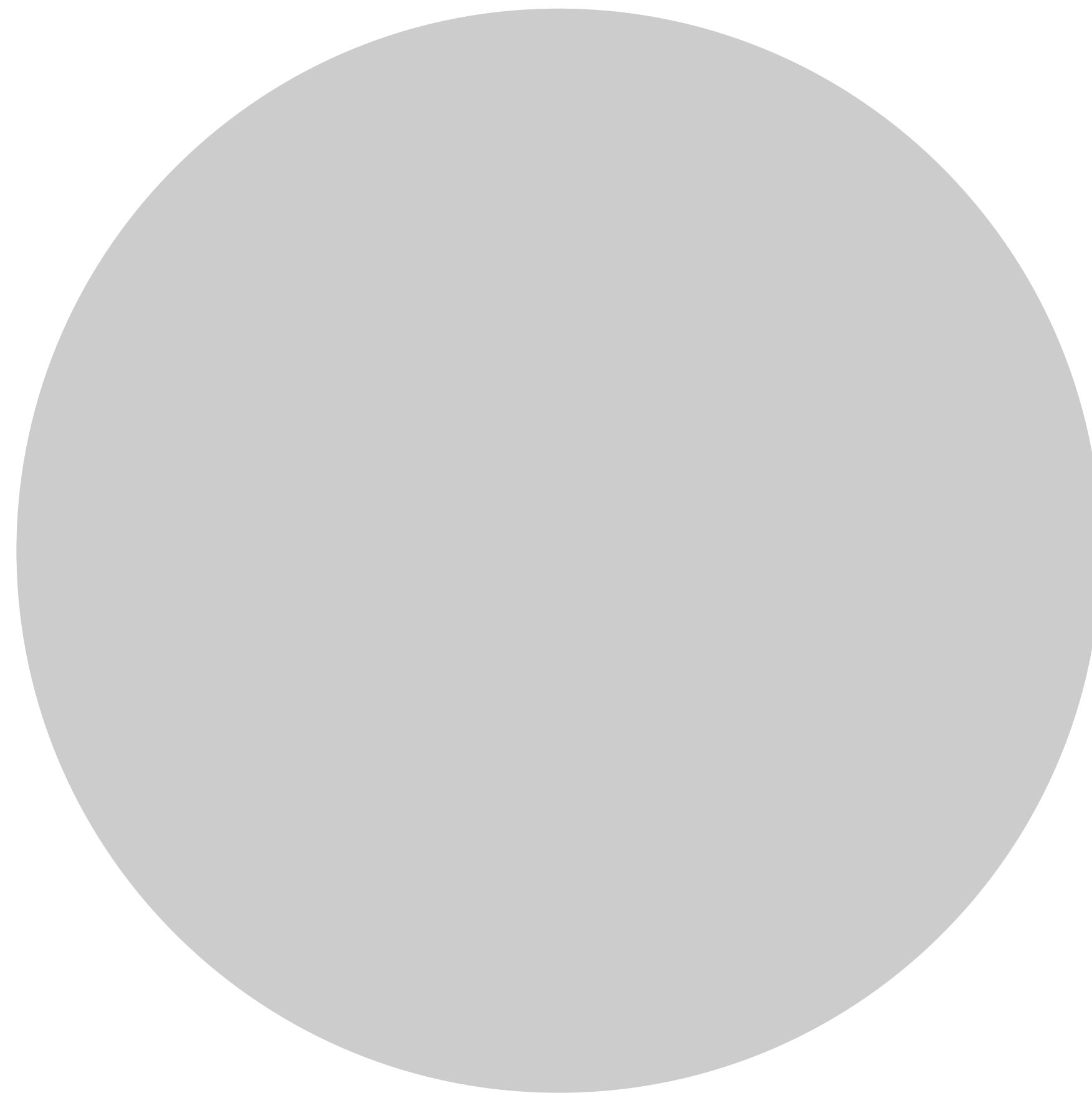


Keemiatööstus 110 aastat



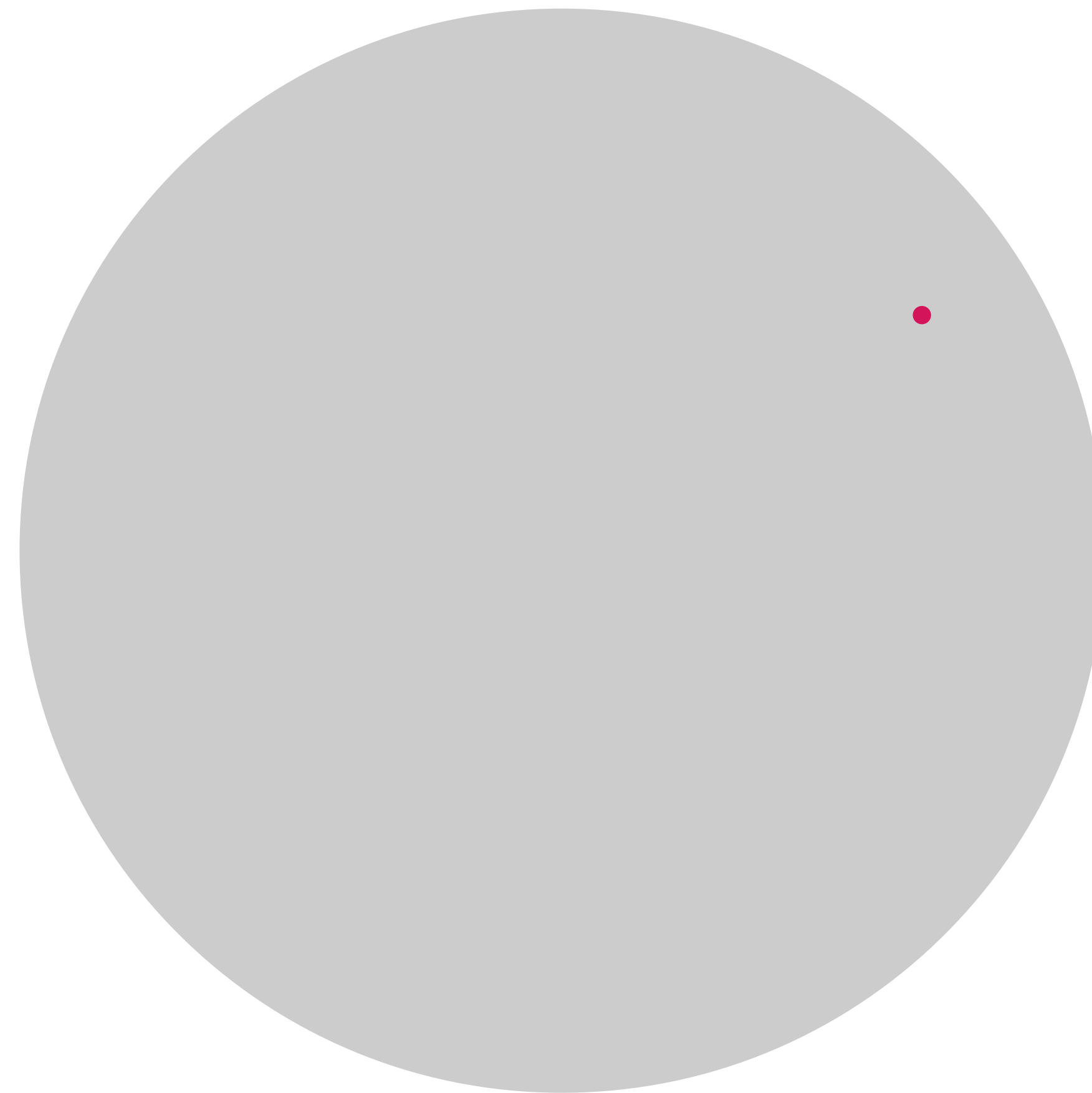
## Kemikaalid Euroopas

Üle 100 000 kemikaali



## Kemikaalid Euroopas

Üle 100 000 kemikaali



60 reguleeritud

## Kemikaalide 6 klassi

**1** Flooritud vee- ja plekikaitse (PFC)



**2** Klooritud anti-mikroobsed ained



**3** Broomitud leegiaeglustid



**4** Bisfenoolid ja ftalaadid



**5** Lahustid



**6** Raskmetallid



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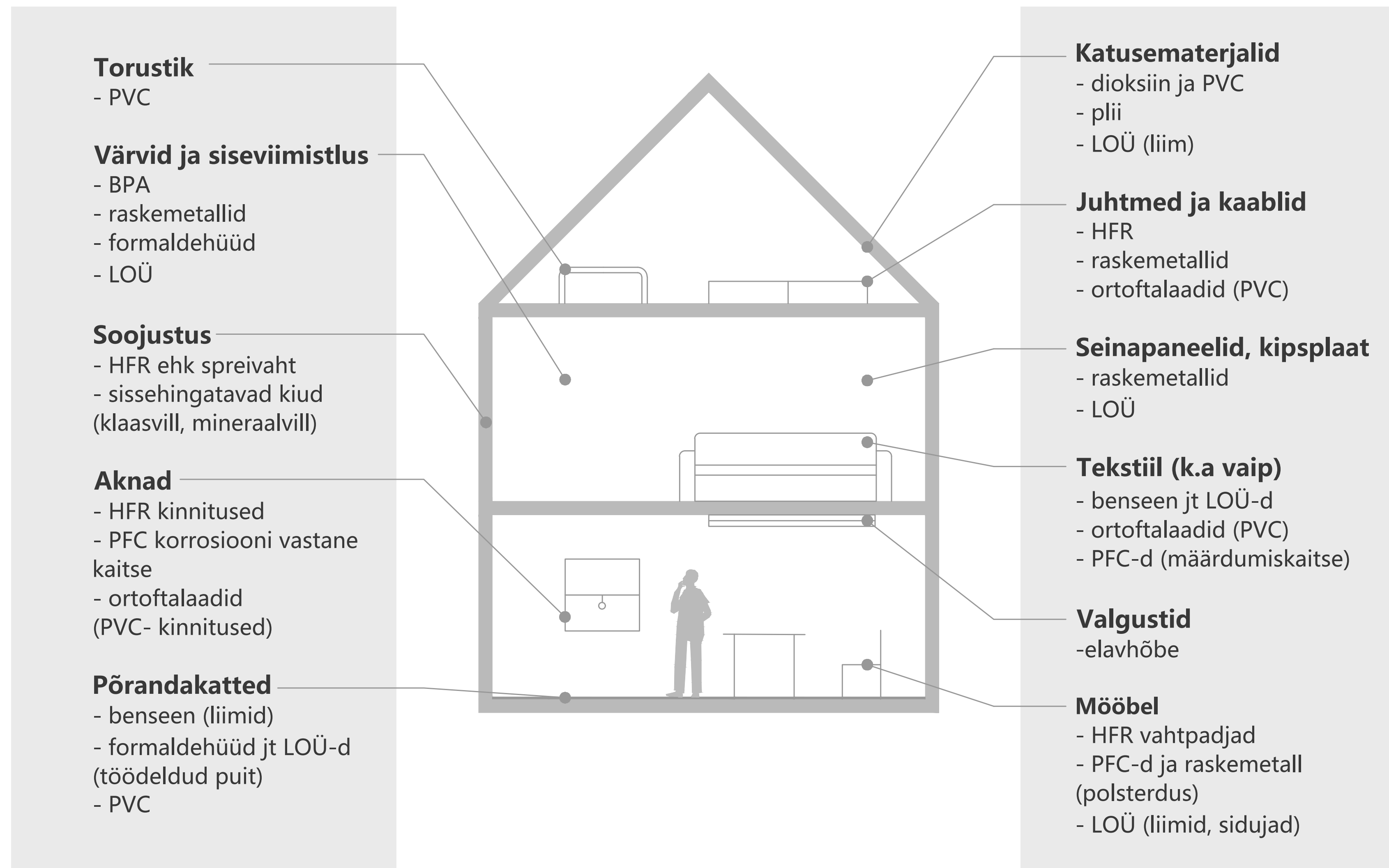
**5** Lahustid



**6** Raskmetallid

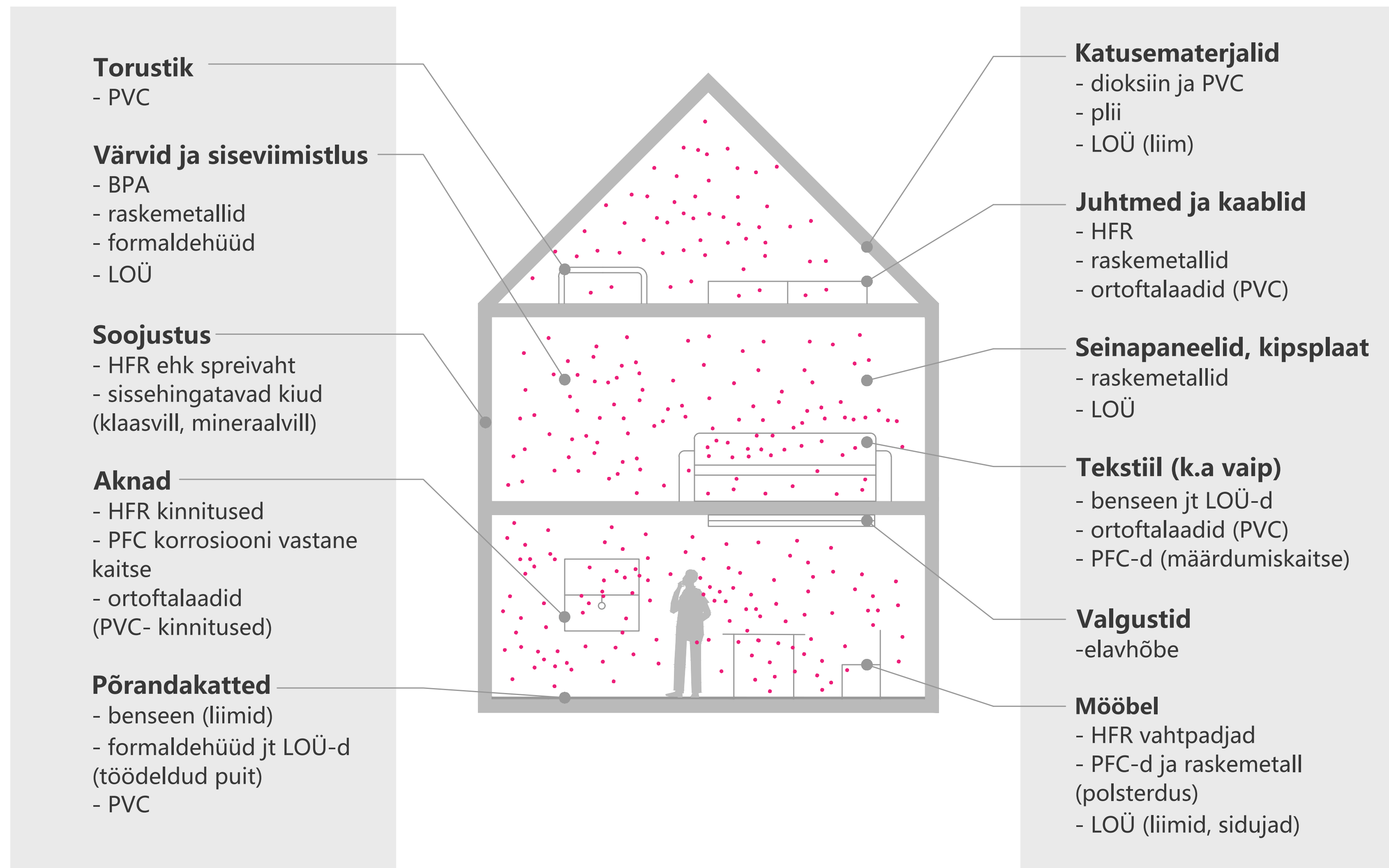


# Kahjulikud materjalid siseruumis

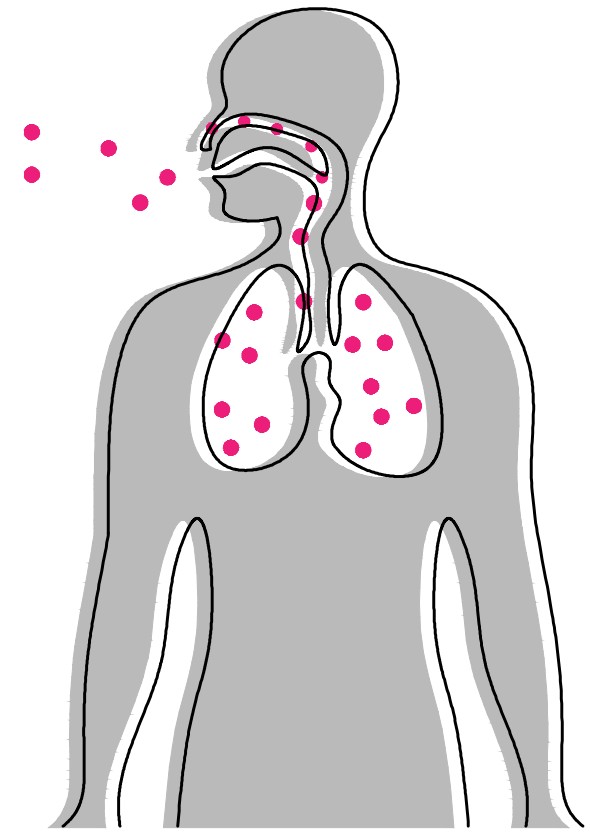




# Kahjulikud materjalid siseruumis

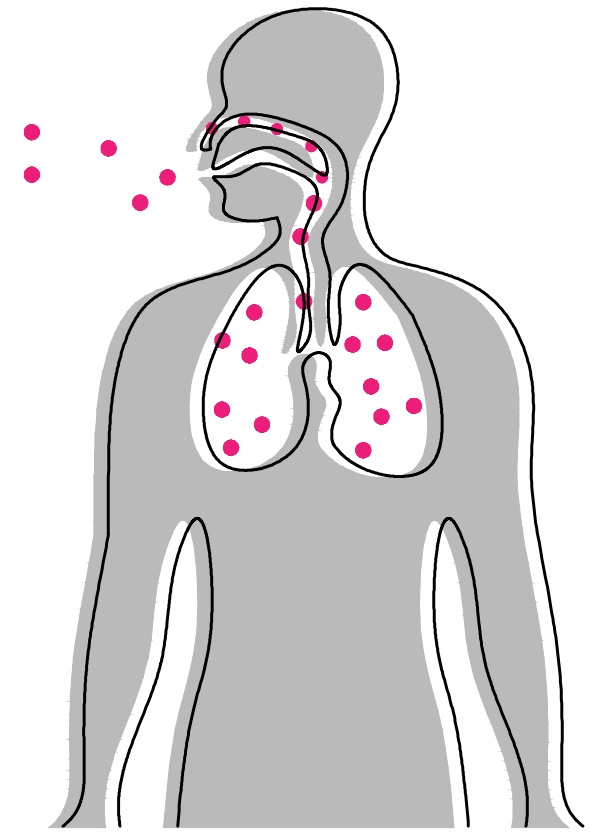


## Kemikaalide sattumine organismi

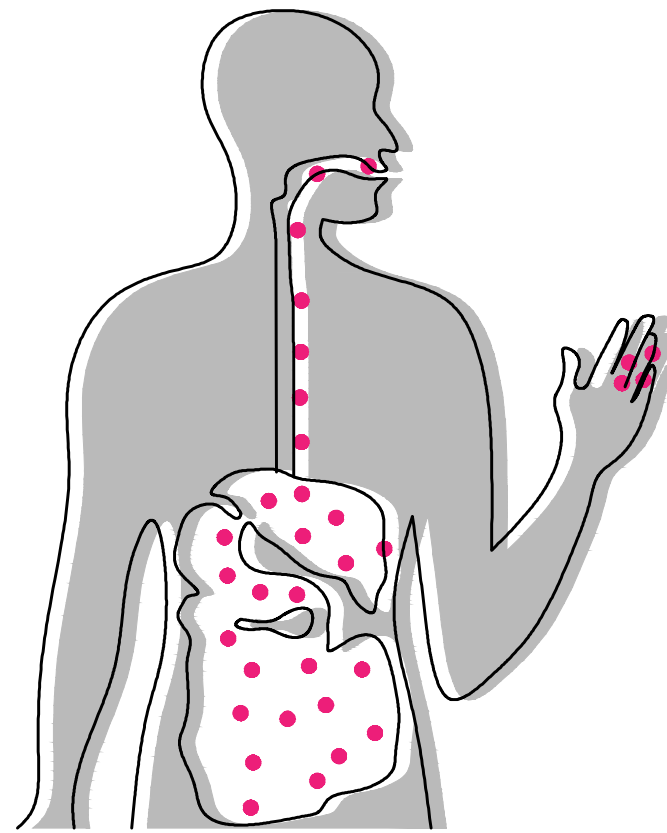


Inhalatsioon

## Kemikaalide sattumine organismi

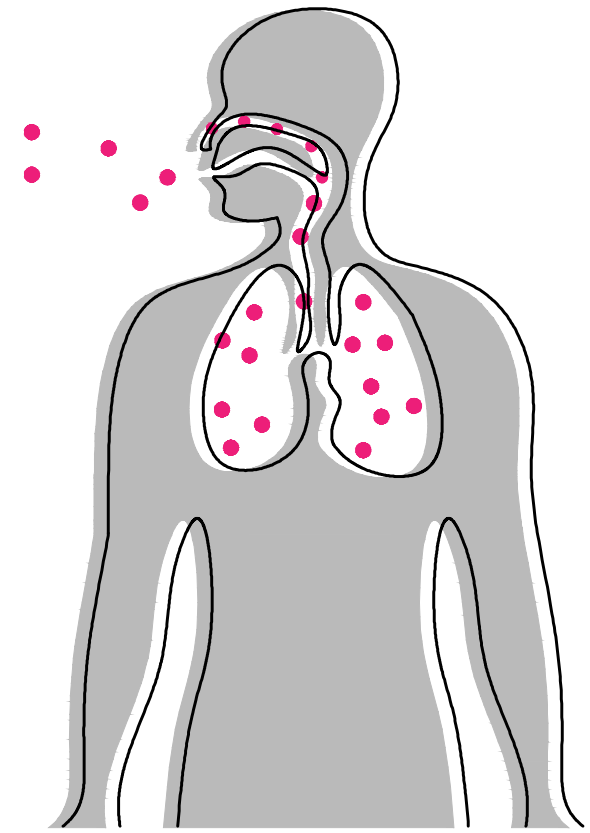


Inhalatsioon

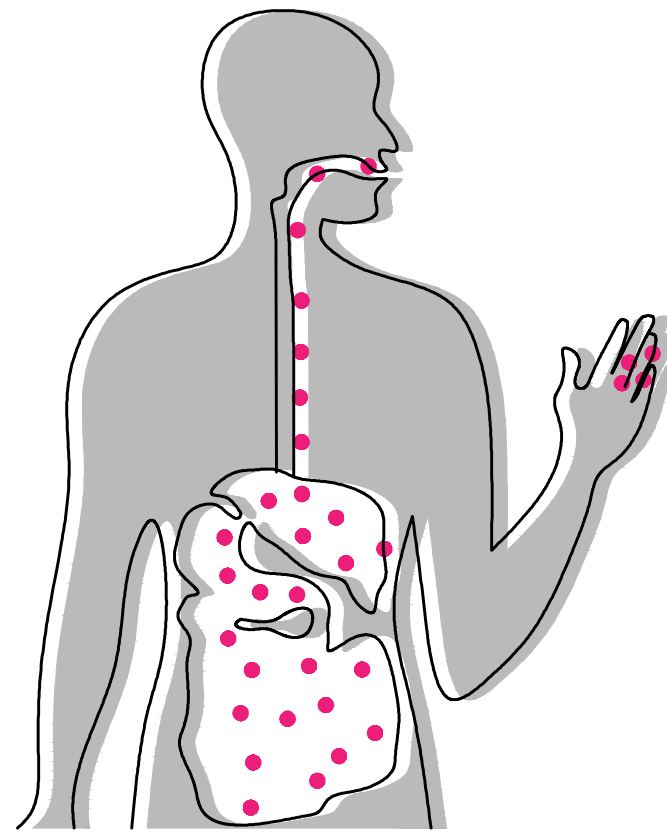


Käest-suhu kontakt

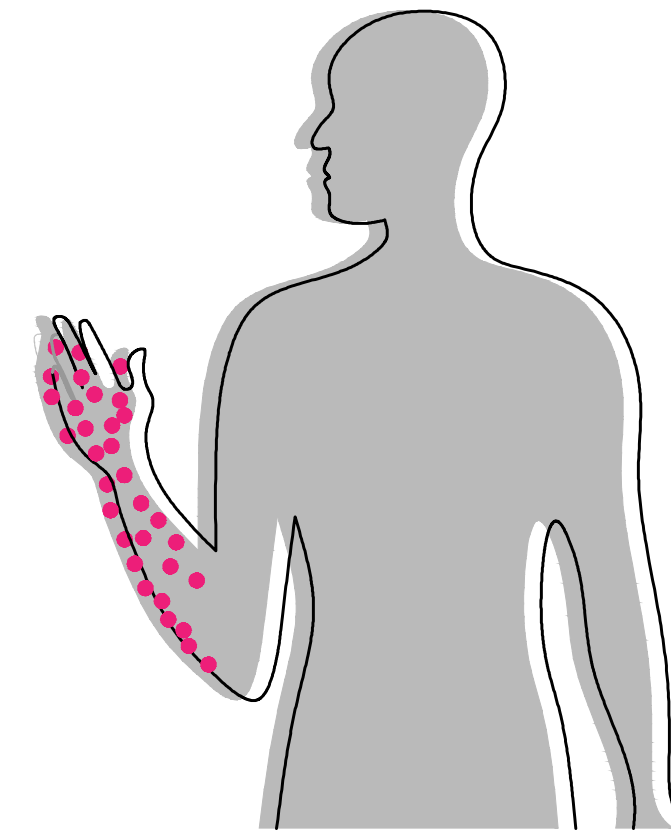
## Kemikaalide sattumine organismi



Inhalatsioon

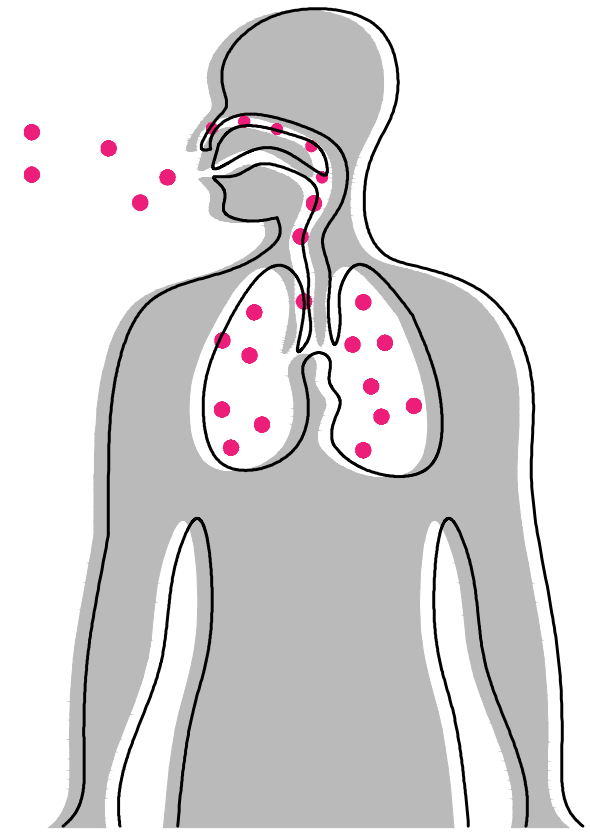


Käest-suhu kontakt

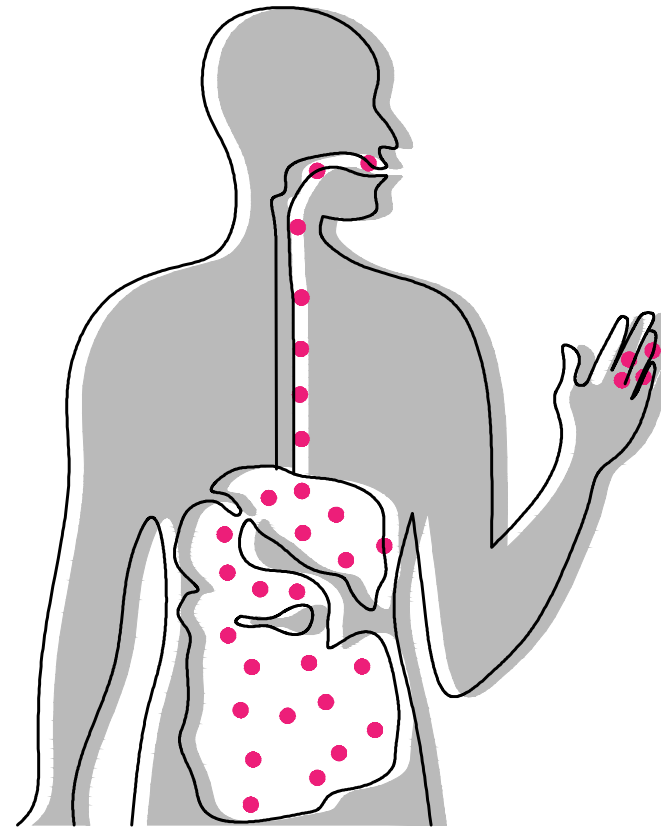


Naha kaudu

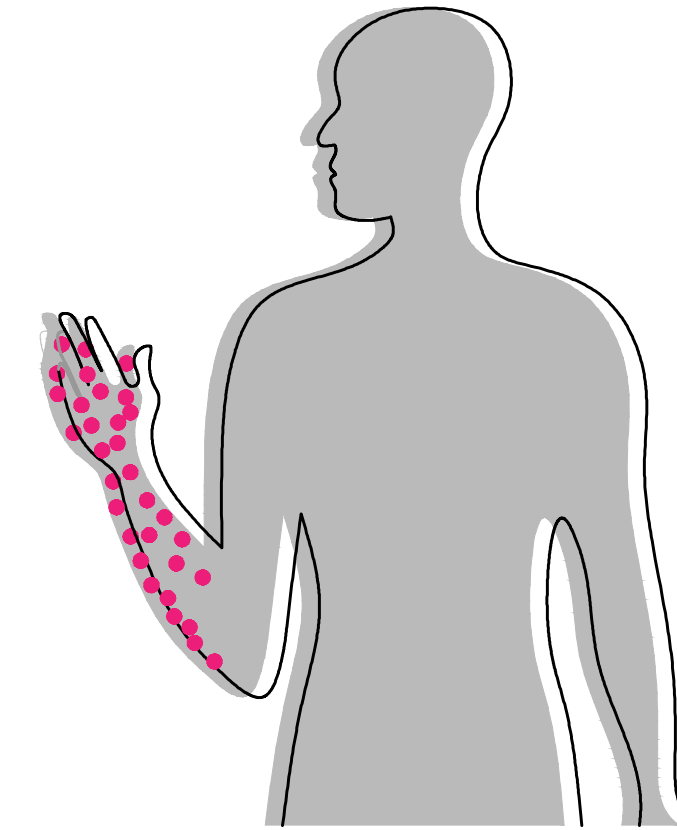
## Kemikaalide sattumine organismi



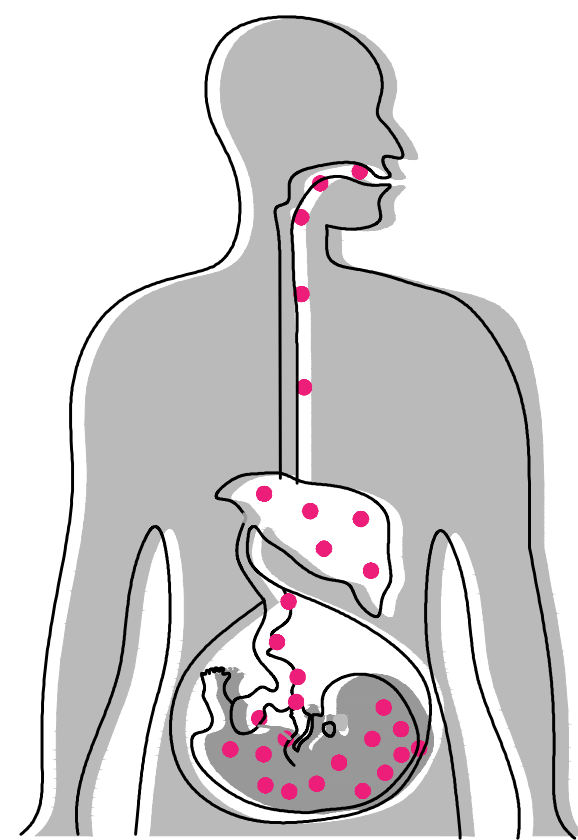
Inhalatsioon



Käest-suhu kontakt

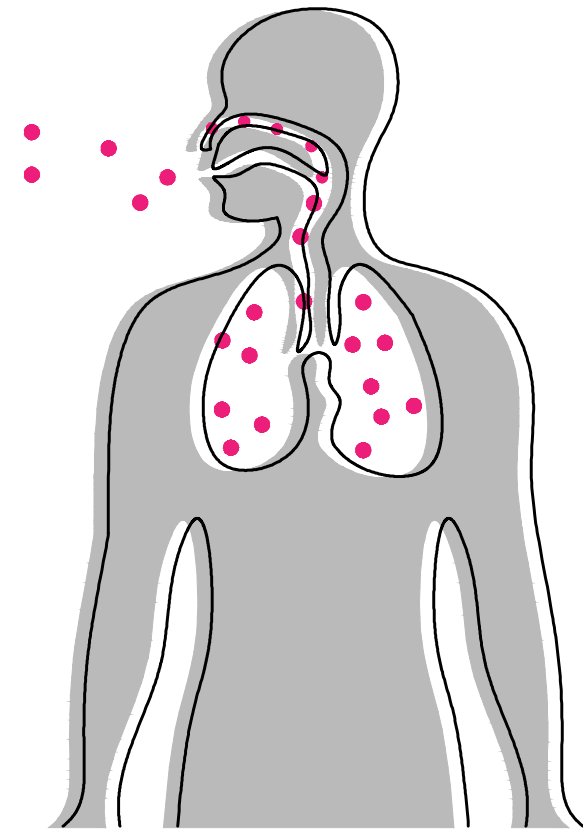


Naha kaudu

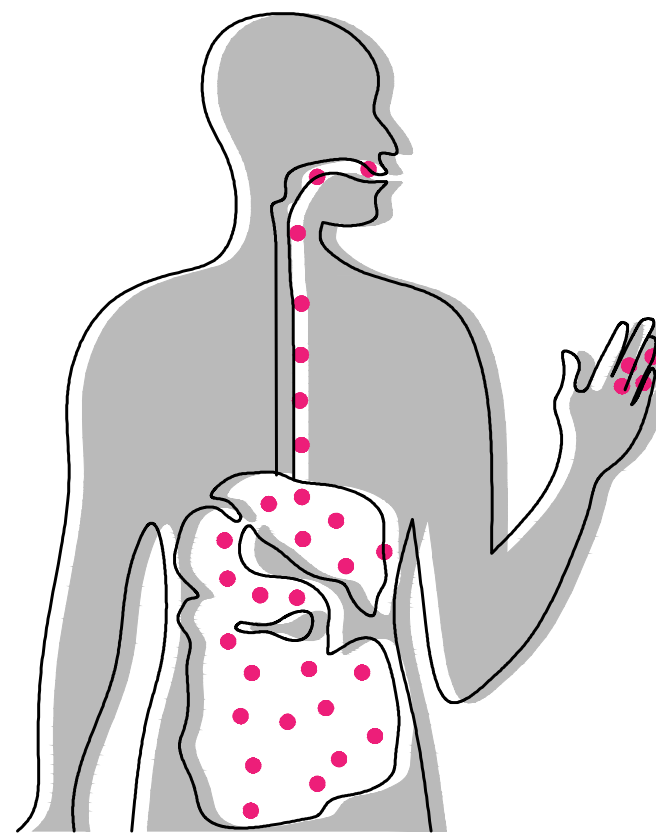


Platsenta ülekanne

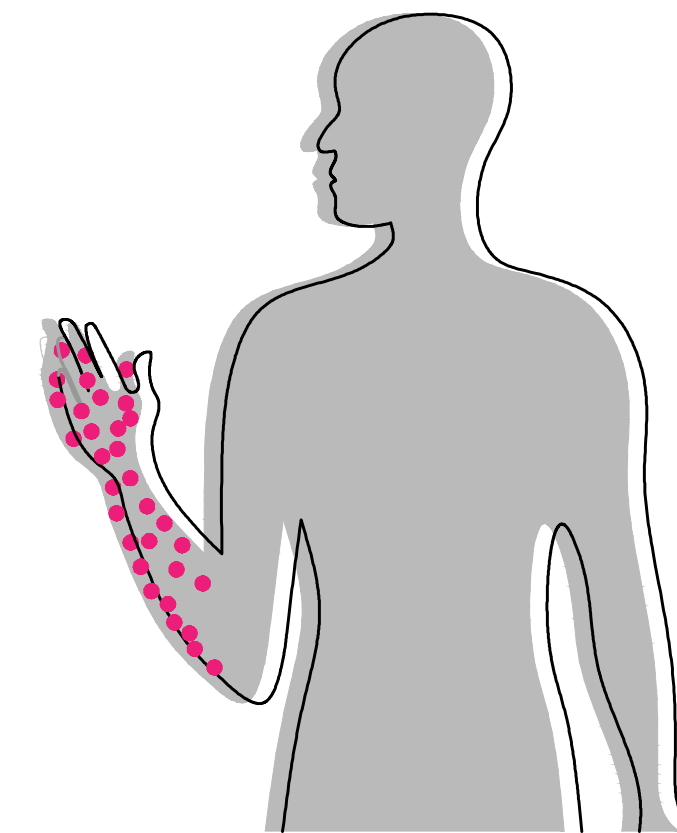
## Kemikaalide sattumine organismi



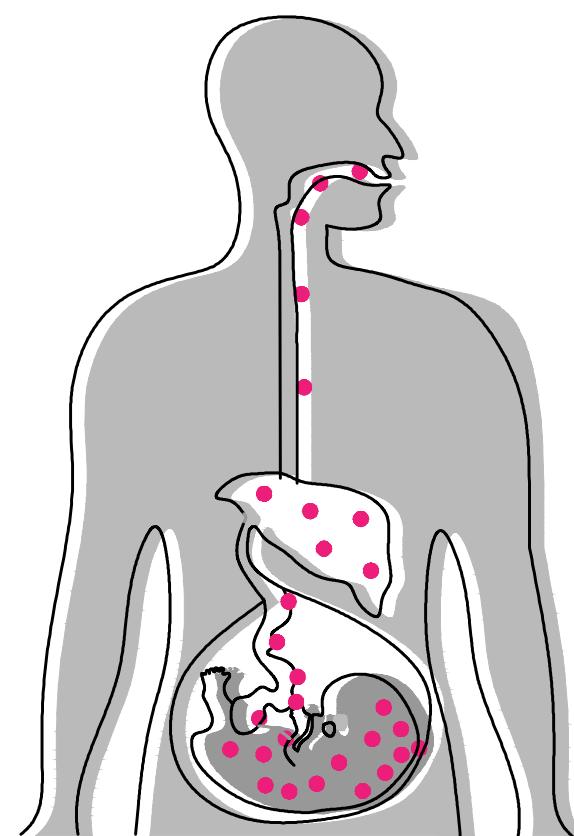
Inhalatsioon



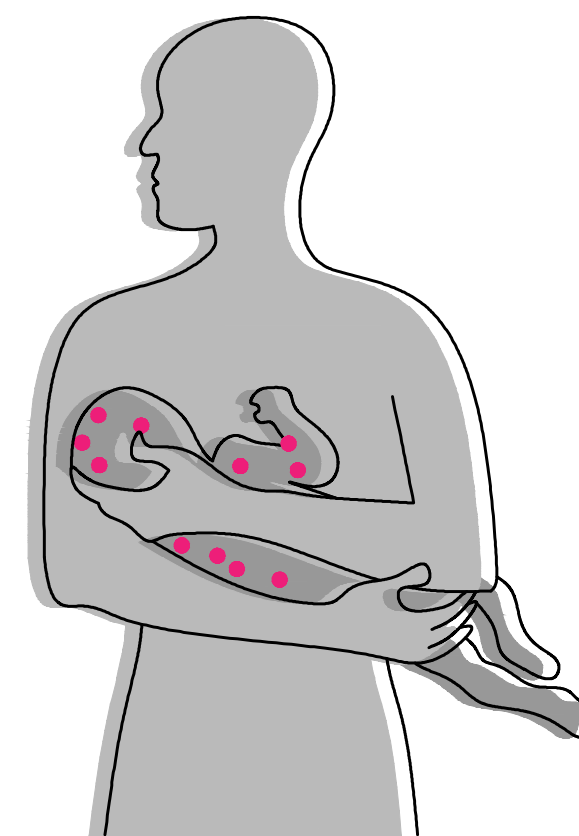
Käest-suhu kontakt



Naha kaudu



Platsenta ülekanne



Imetamise teel

## Mõju tervisele

### Lühiajalised



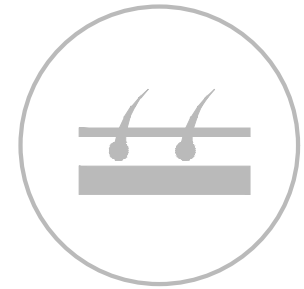
Peavalu



Hingamisteede  
ärritus, köha



Nina- kurgu-,  
silmapõletk



Nahaärritus,  
allergia



Kopsupõletik,  
bronhiit

## Mõju tervisele



Haige maja sündroom



## Mõju tervisele

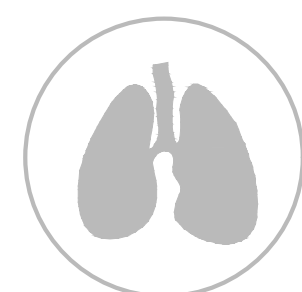
### Lühiajalised



Peavalu



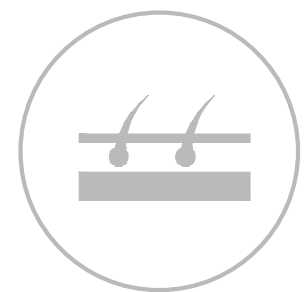
Nina- kurgu-,  
silmapõletk



Kopsupõletik,  
bronhiit



Hingamisteede  
ärritus, köha

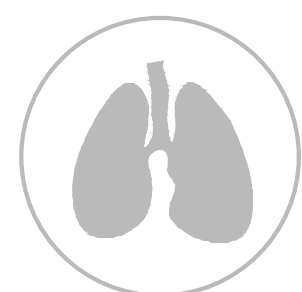


Nahaärritus,  
allergia

### Pikaajalised



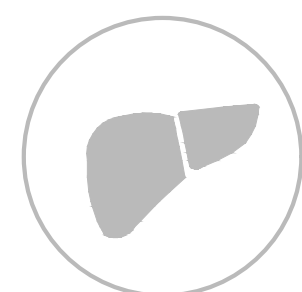
Südame- ja  
veresoontõnna-  
haigused



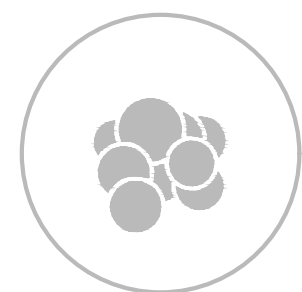
Astma



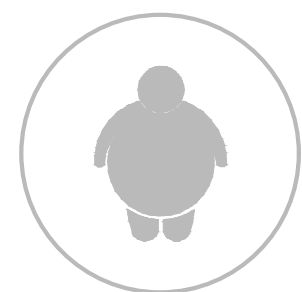
Autism



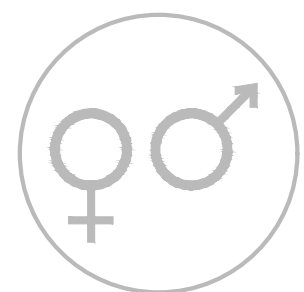
Maksa- ja  
põrnahaigused



Vähk



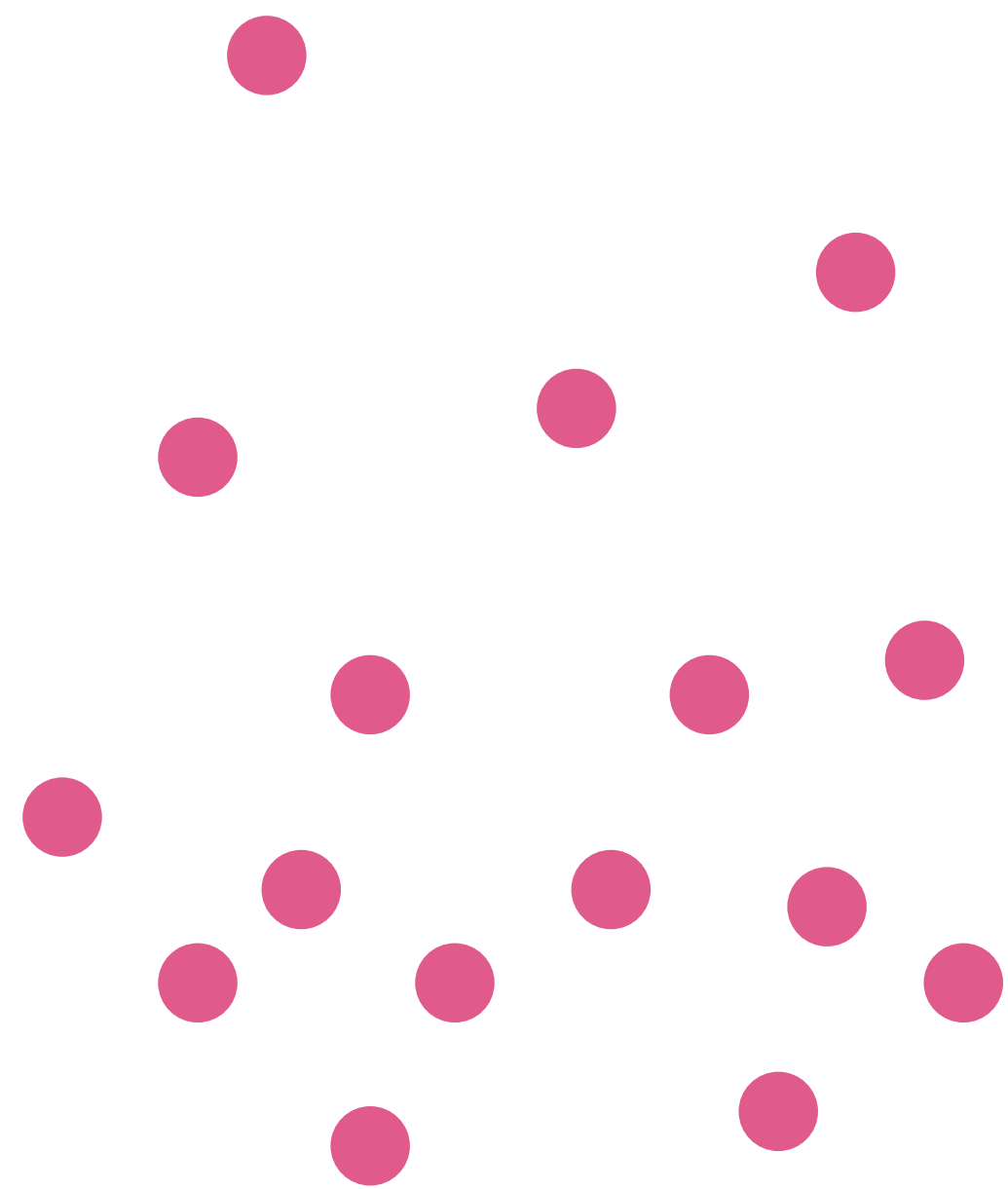
Ülekaalulisus



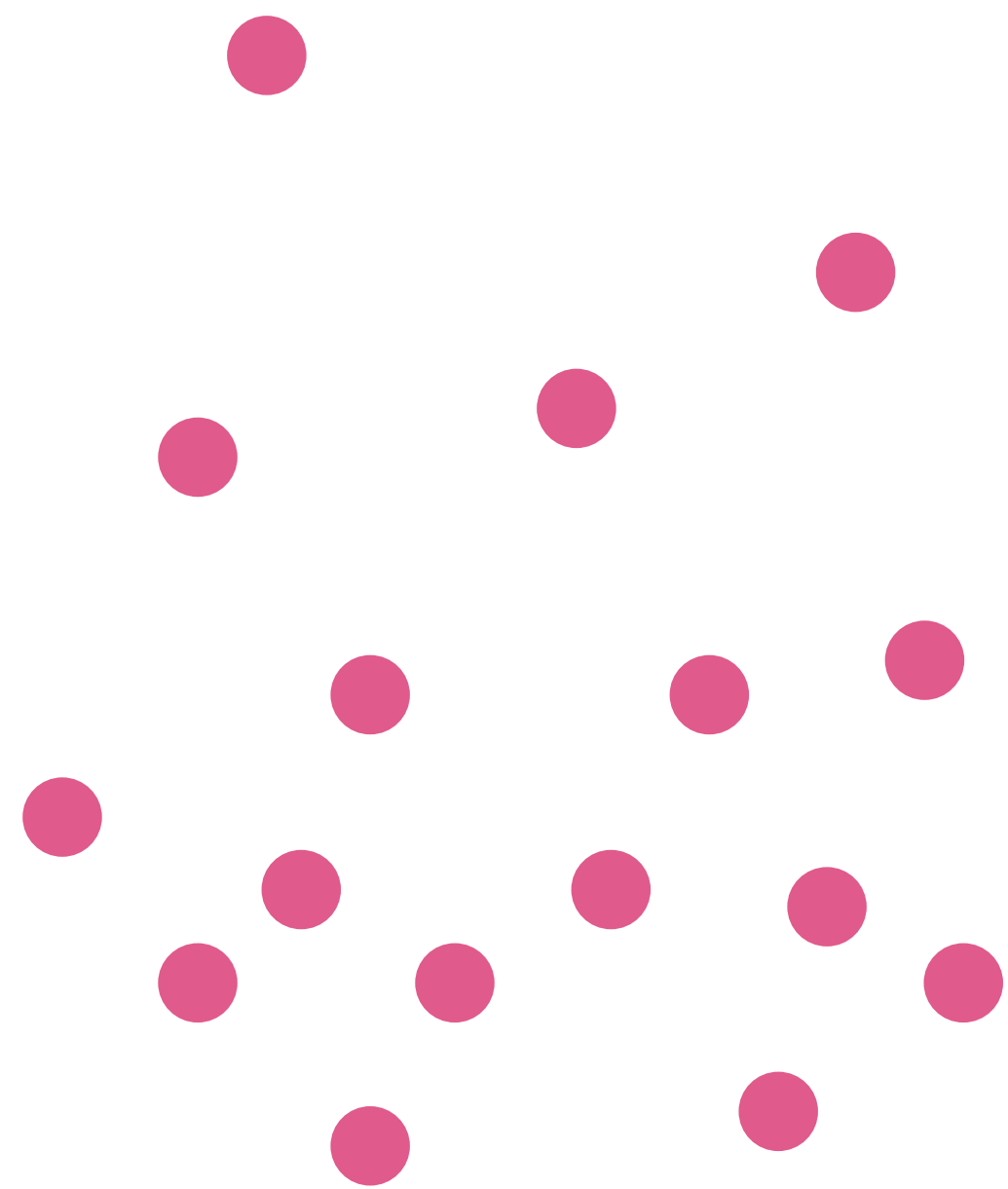
Viljatus



Kesknärvisüsteem,  
ärevushäired,  
migreen



Lenduvad orgaanilised ühendid - LOÜ



Lenduvad orgaanilised ühendid - LOÜ

Volatile organic compounds - VOC

## Õhukvaliteedi detektor



Igeress Air Quality Monitor

HCHO - formaldehüüd

TVOC - lenduvate orgaaniliste  
ühendite koguarv

PM - peened mikroosakesed

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# Siseõhukvaliteet

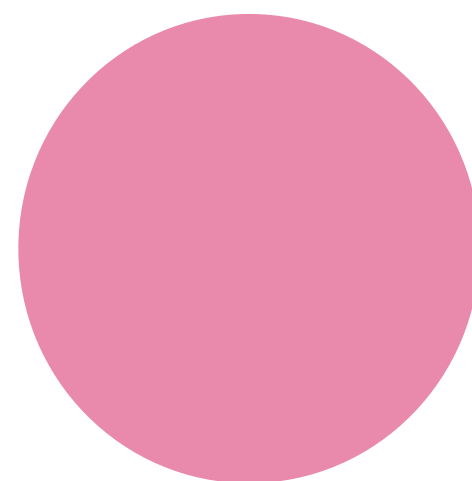
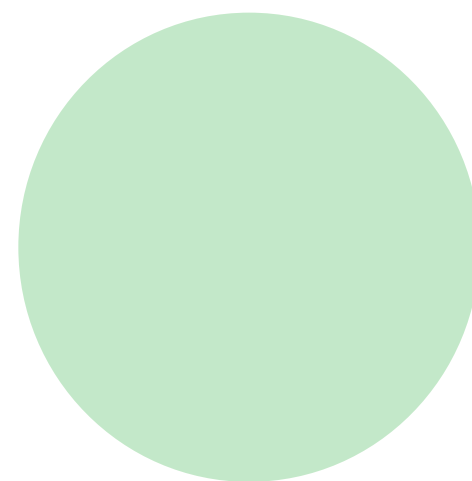
## Maailma Terviseorganisatsioon

HCHO mg/m <sup>3</sup>
< 0,1 Madal
> 0,1 Kõrge

TVOC mg/m <sup>3</sup>
< 0,3 Madal
0,3 - 0,5 Aktsepteeritav
0,5 - 1 Marginaalne
1 - 3 Kõrge

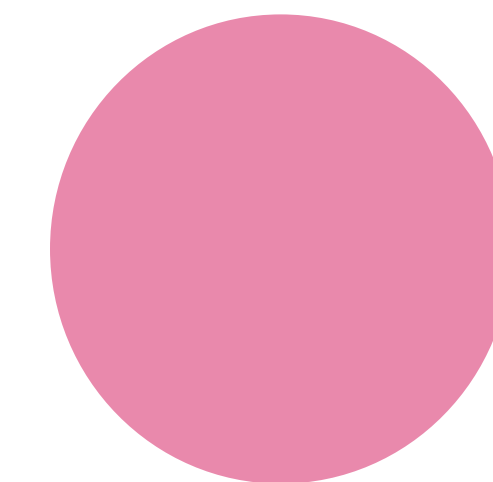
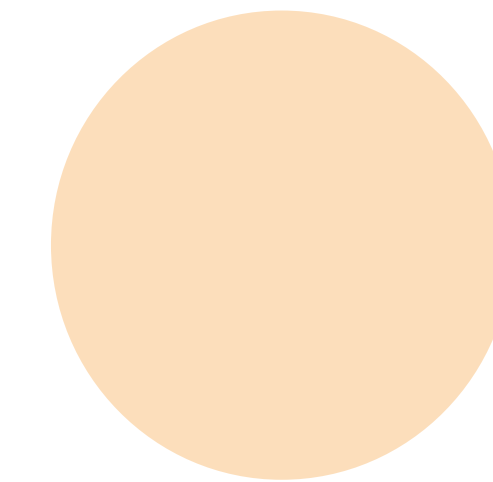
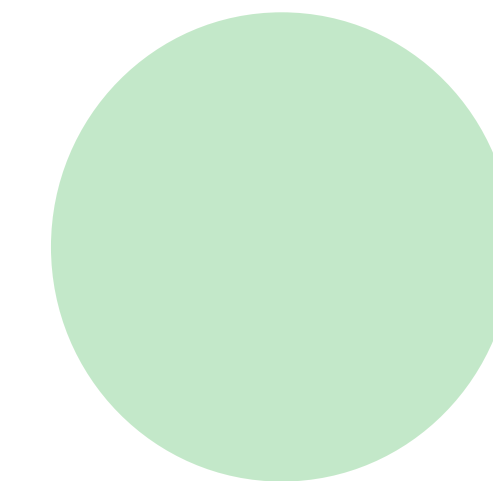
# Siseõhukvaliteet

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HCHO mg/m <sup>3</sup>
< 0,1 Madal
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TVOC mg/m <sup>3</sup>
< 0,3 Madal
0,3 - 0,5 Aktsepteeritav
0,5 - 1 Marginaalne
1 - 3 Kõrge





## Kohtla-Järve Gümnaasium

Autorid: BOA Arhitektid ja PLSAB

Avatud: 2019 september

Eesmärk uurida seost siseõhu kvaliteedi ja ruumikasutaja enesetunde vahel



## Kohtla-Järve Gümnaasium



Seinad ja lagi: lateksvärv



## Kohtla-Järve Gümnaasium



Seinad ja lagi: lateksvärv

Mööbel: lamineeritud, spoonitud



## Kohtla-Järve Gümnaasium



Seinad ja lagi: lateksvärv

Mööbel: lamineeritud, spoonitud



Aknakate: tulekindel ruloo

## Kohtla-Järve Gümnaasium



Seinad ja lagi: lateksvärv

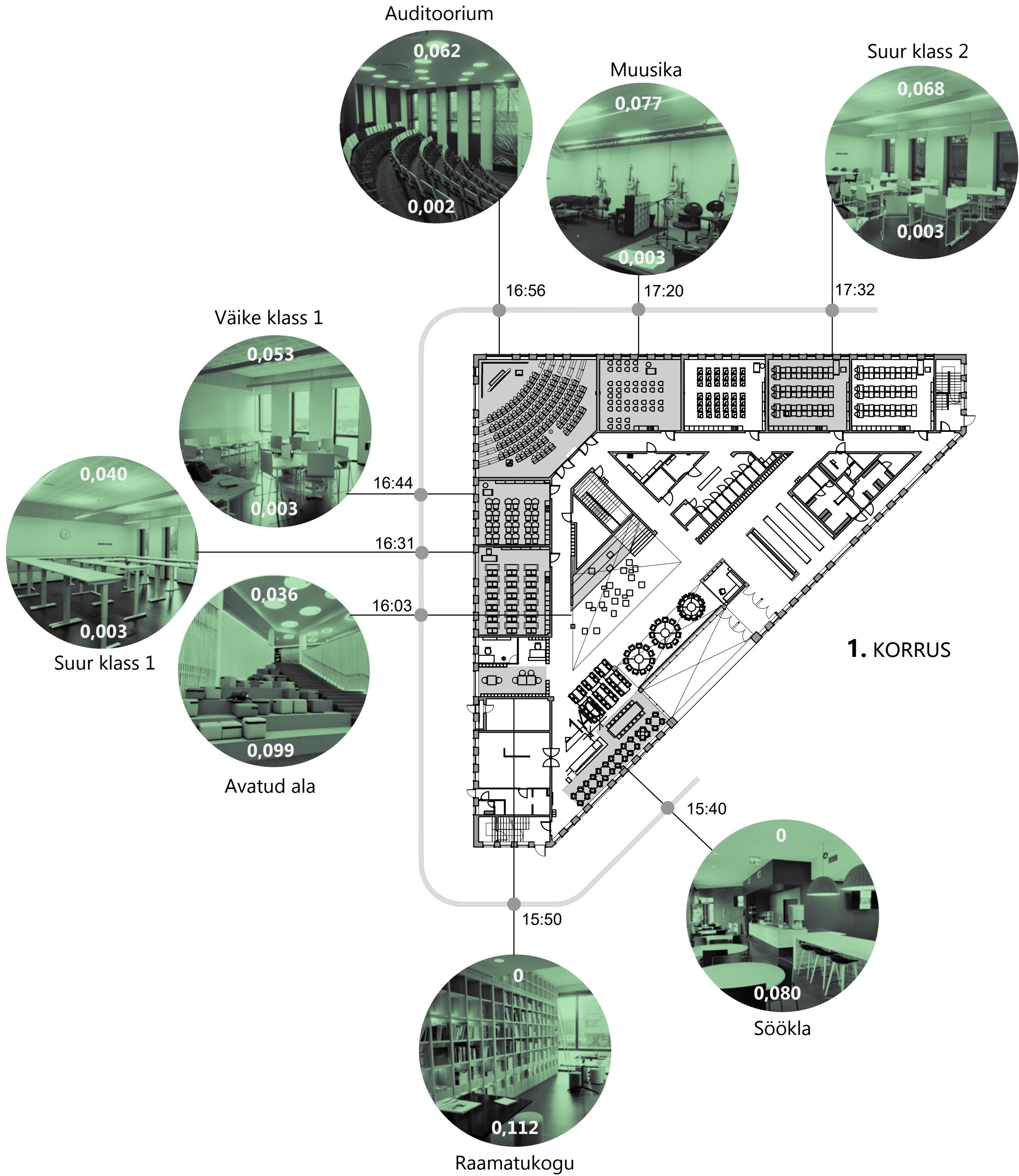
Mööbel: lamineeritud, spoonitud

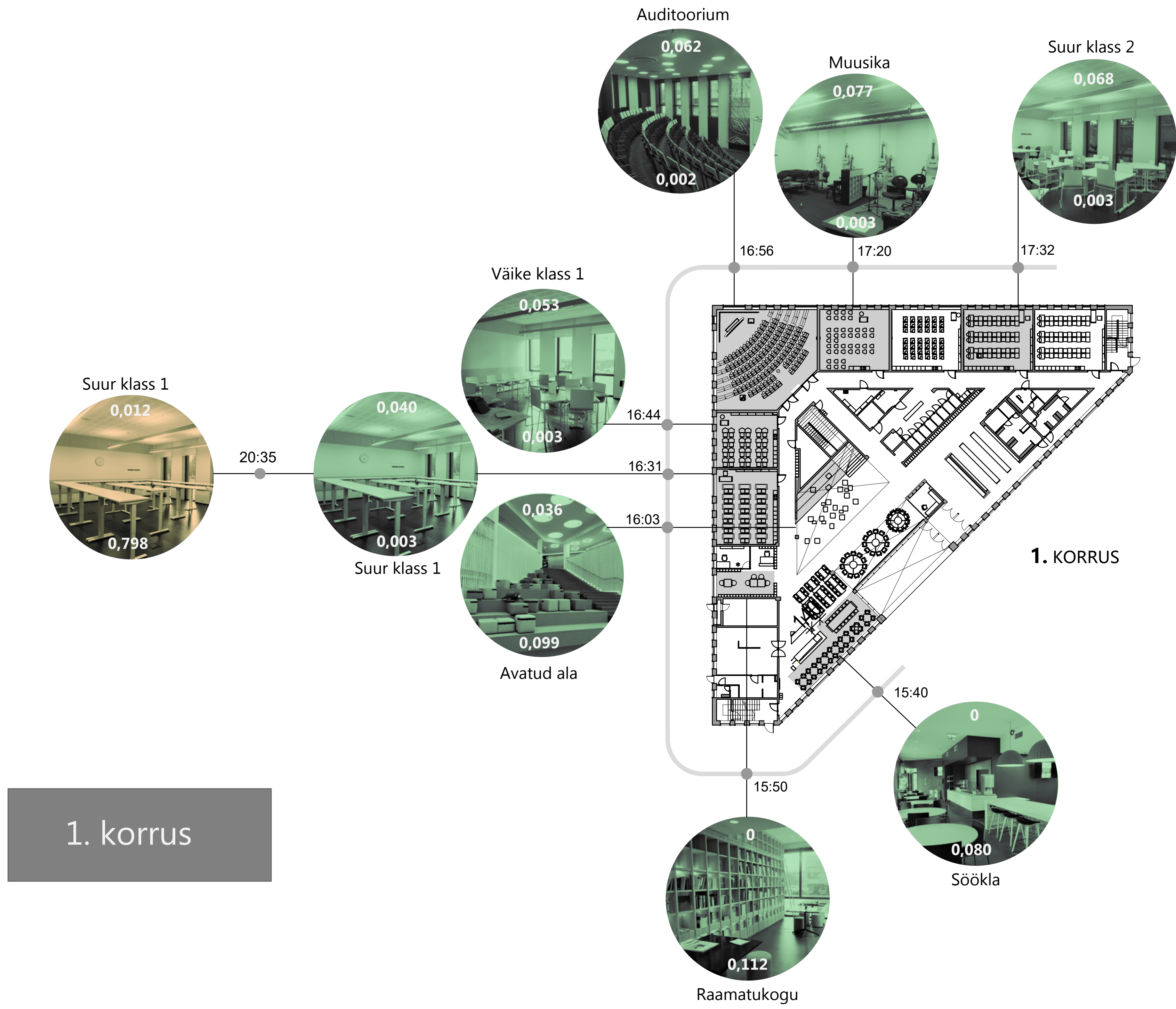


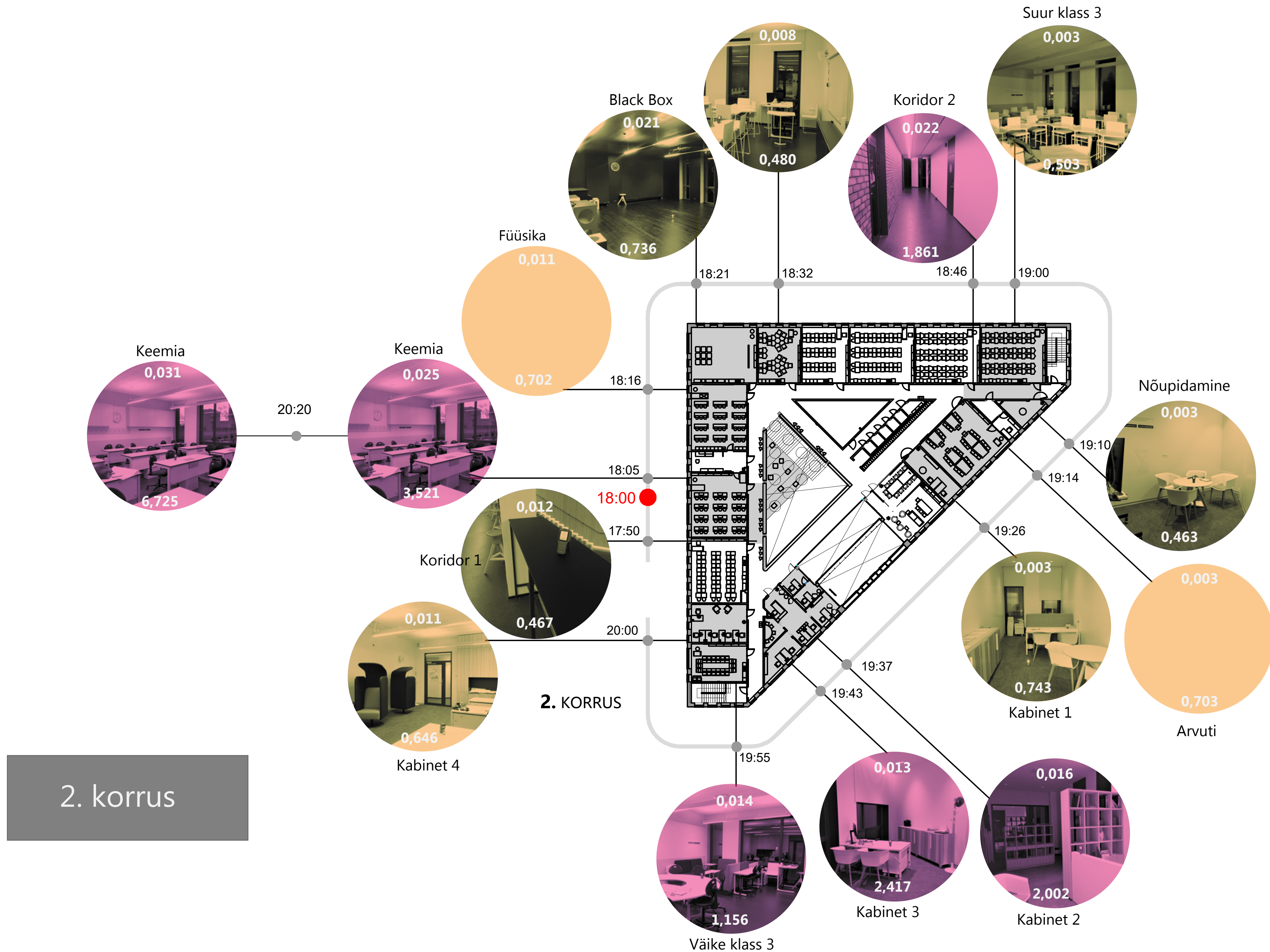
Aknakate: tulekindel ruloo

Põrand: PVC, vaipkate, EPO

1. korrus









Küsimustik

78 %

Haige maja sündroomi sümptomid

## Küsimustik

78 %

Haige maja sündroomi sümptomid

16 ruumi

seostati halva enesetundega

## Küsimustik

78 %

haige maja sündroomi sümptomid

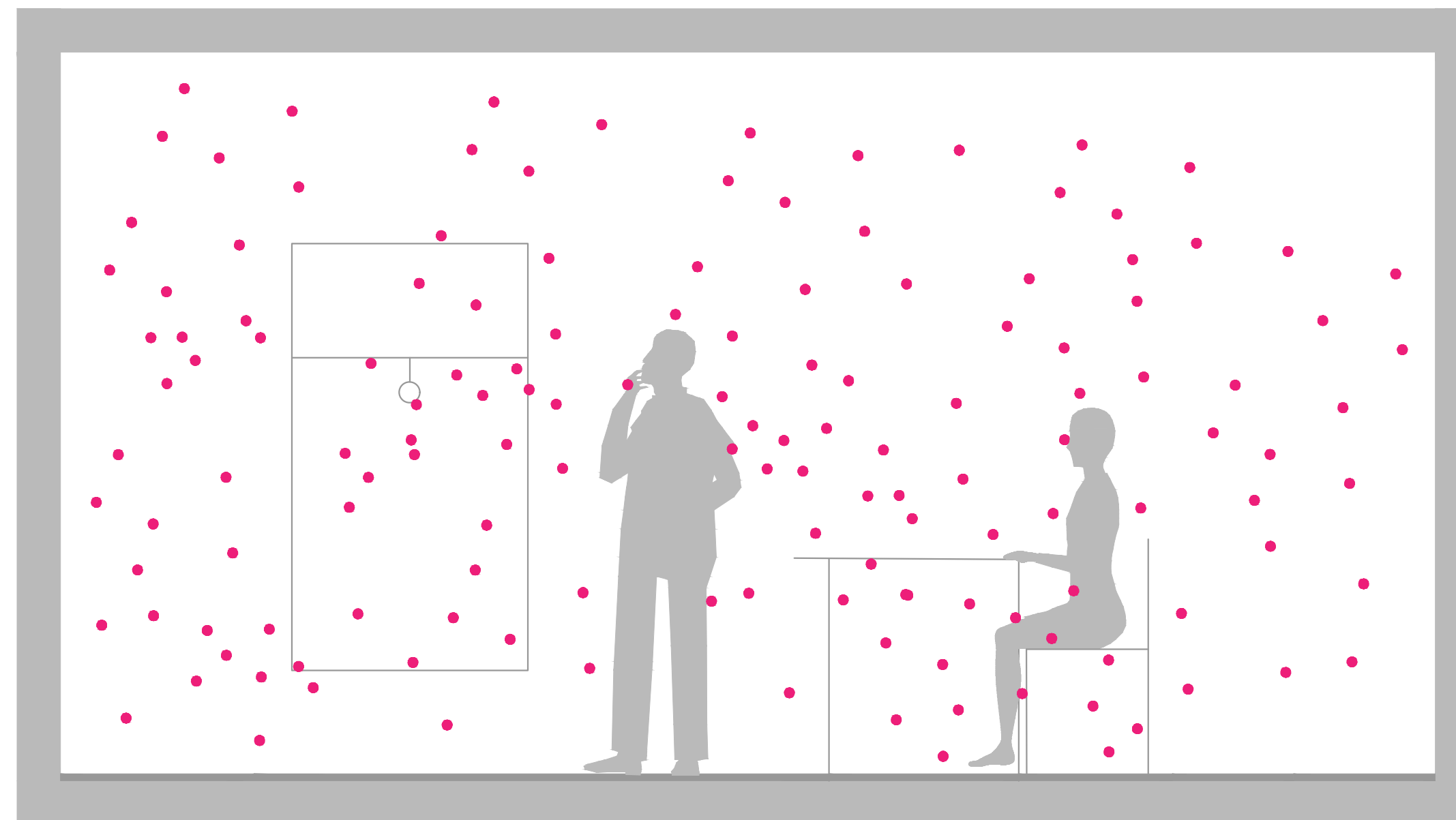
16 ruumi

seostati halva enesetundega

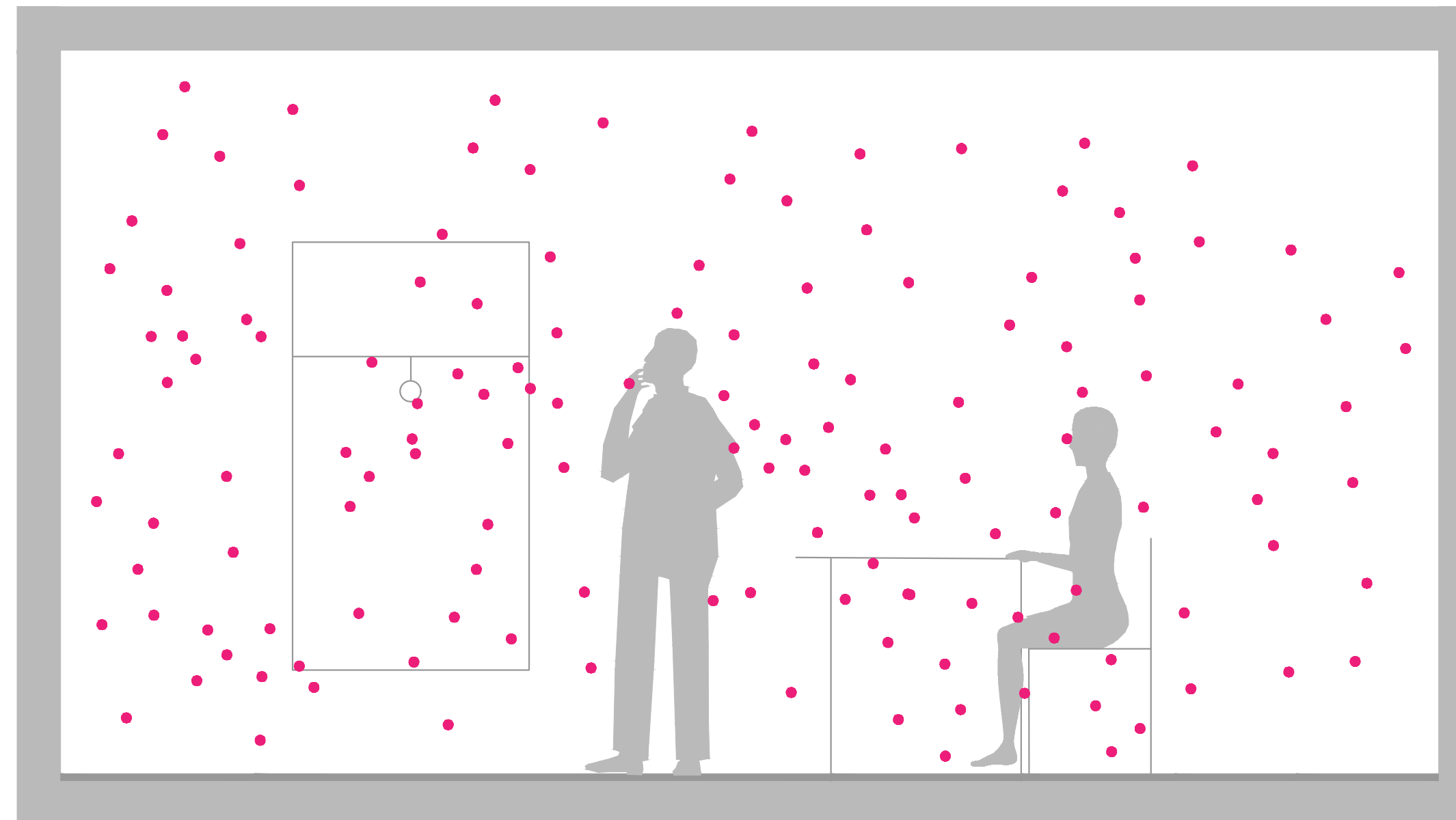
70,7 %

ruumide tuulutus 2-3 või enam kordi päevas

## Ainult ventilatsioonist ei piisa

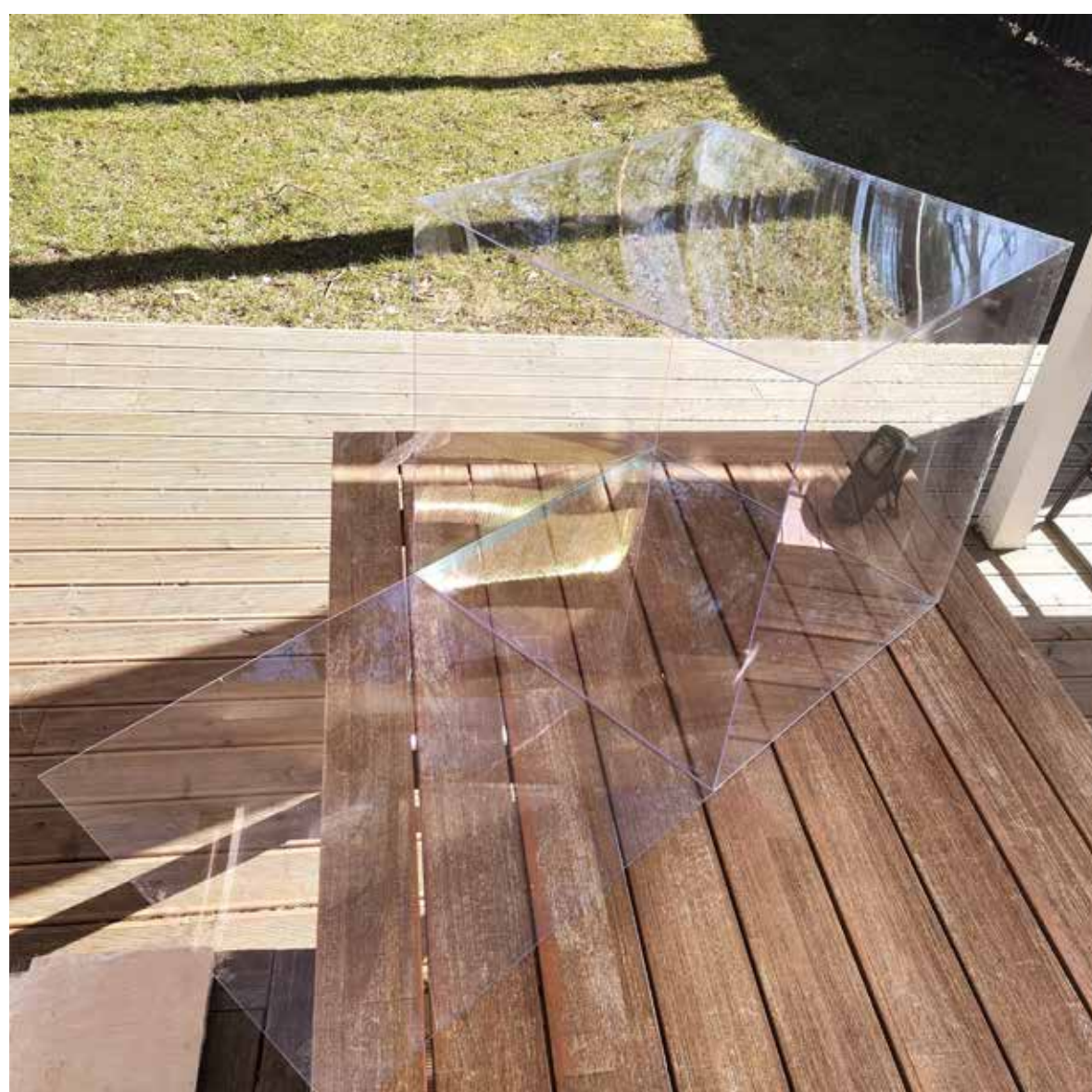


**Ainult ventilatsioonist ei piisa**



**Inimene puutub materjaliga otse kokku**

## Materjalid



Eesmärk: kas ja kui palju eraldub materjalidest lenduvaid orgaanilisi ühendeid?

Katsekast: akrüül 500x500x500 mm

Igeress Air Quality Monitor

Puit

**HCHO: 0,1**

**TVOC: 0,3**

# Puit



Vineer 12 mm



# Puit

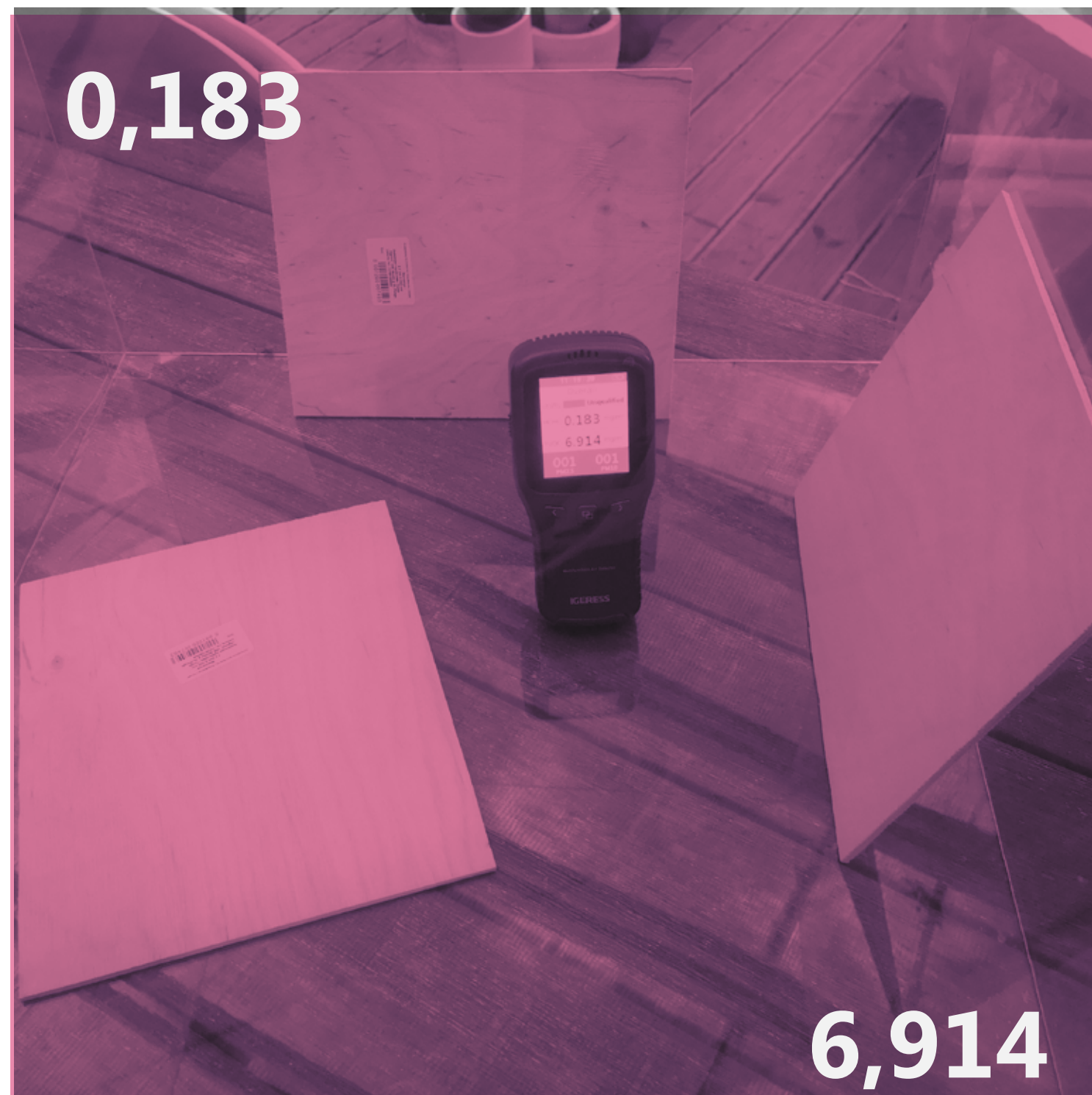


Vineer 4 mm



Vineer 12 mm

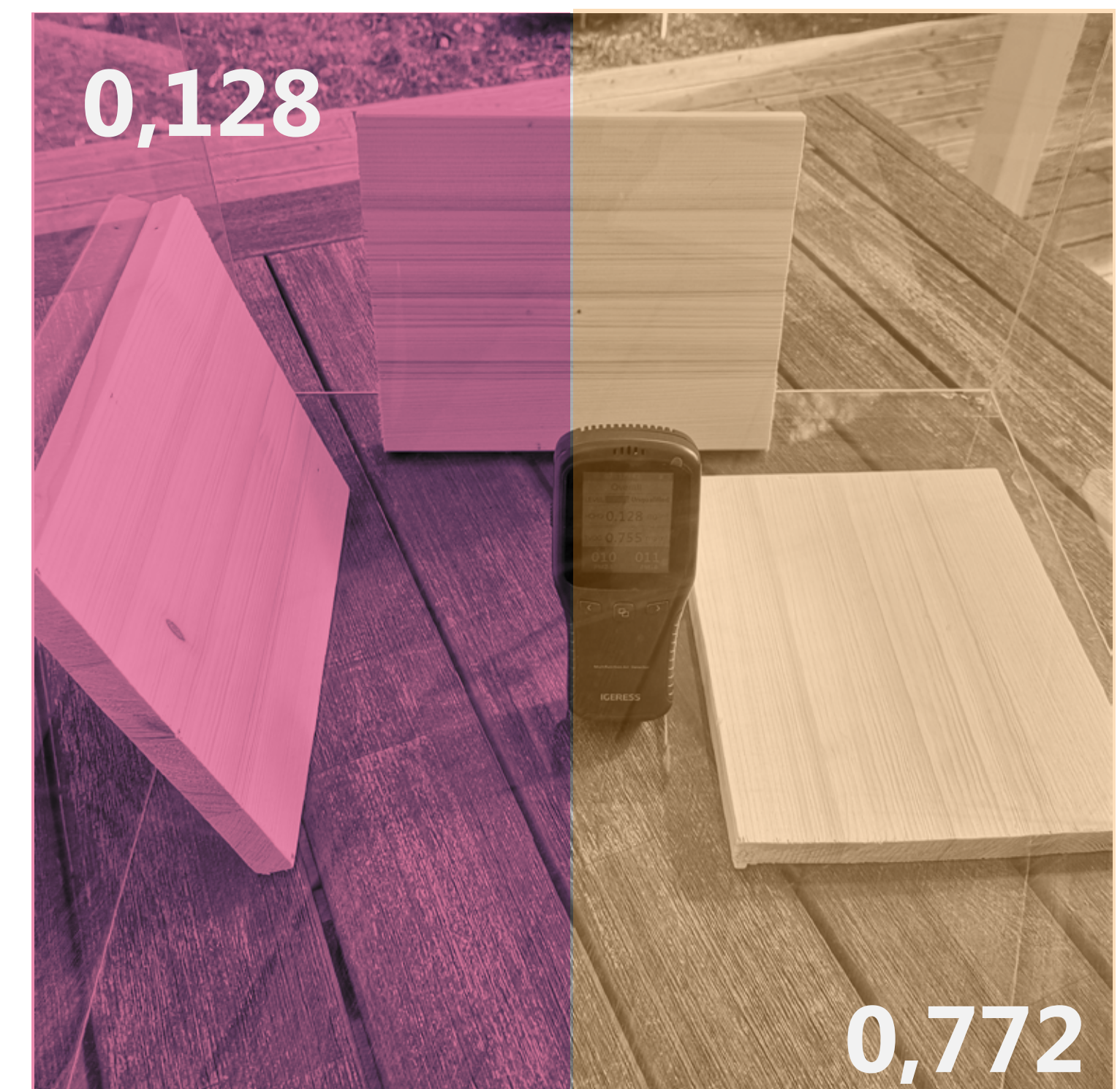
# Puit



Vineer 4 mm

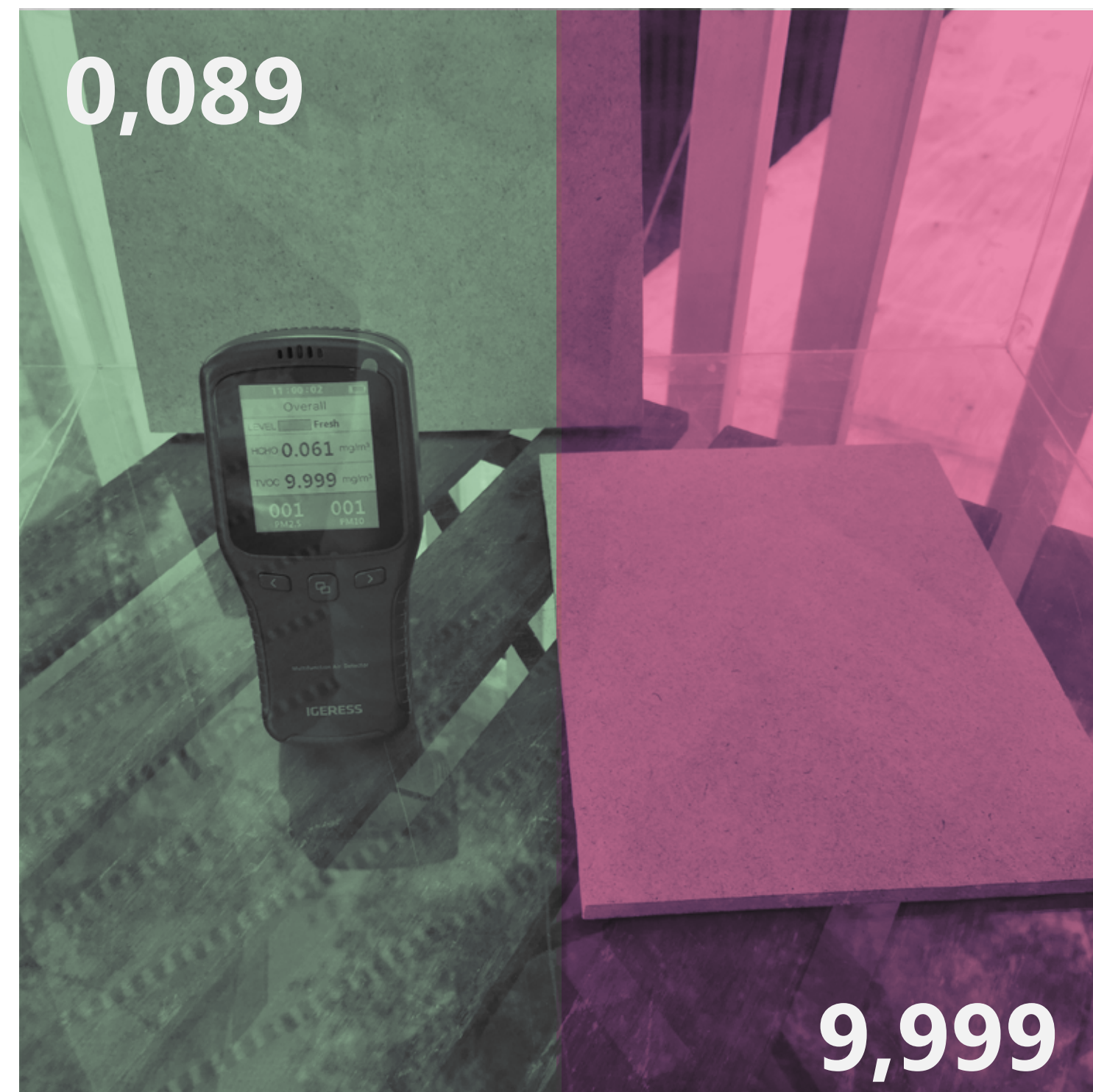


Vineer 12 mm



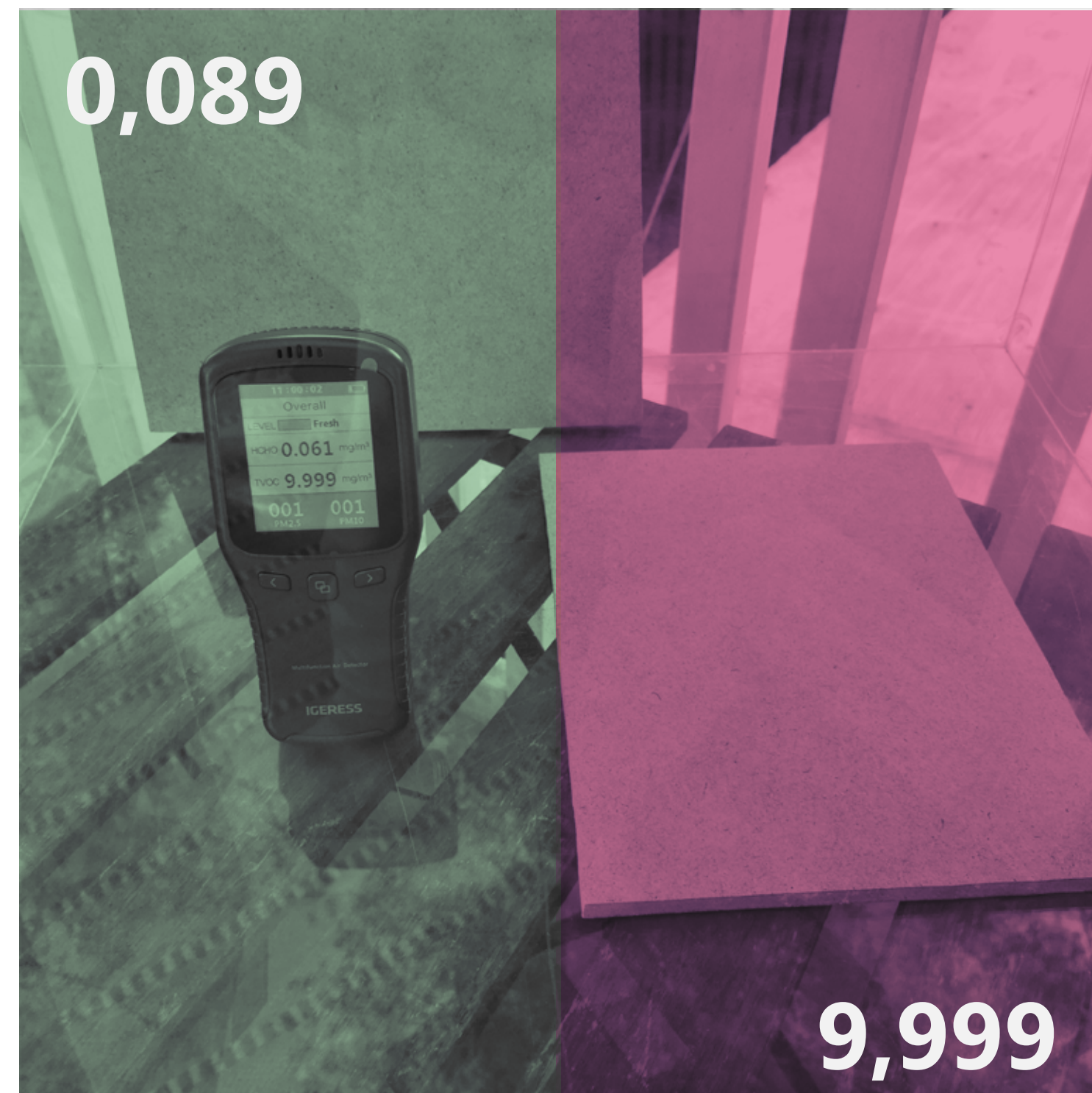
Liimpuit 18 mm

# Puit

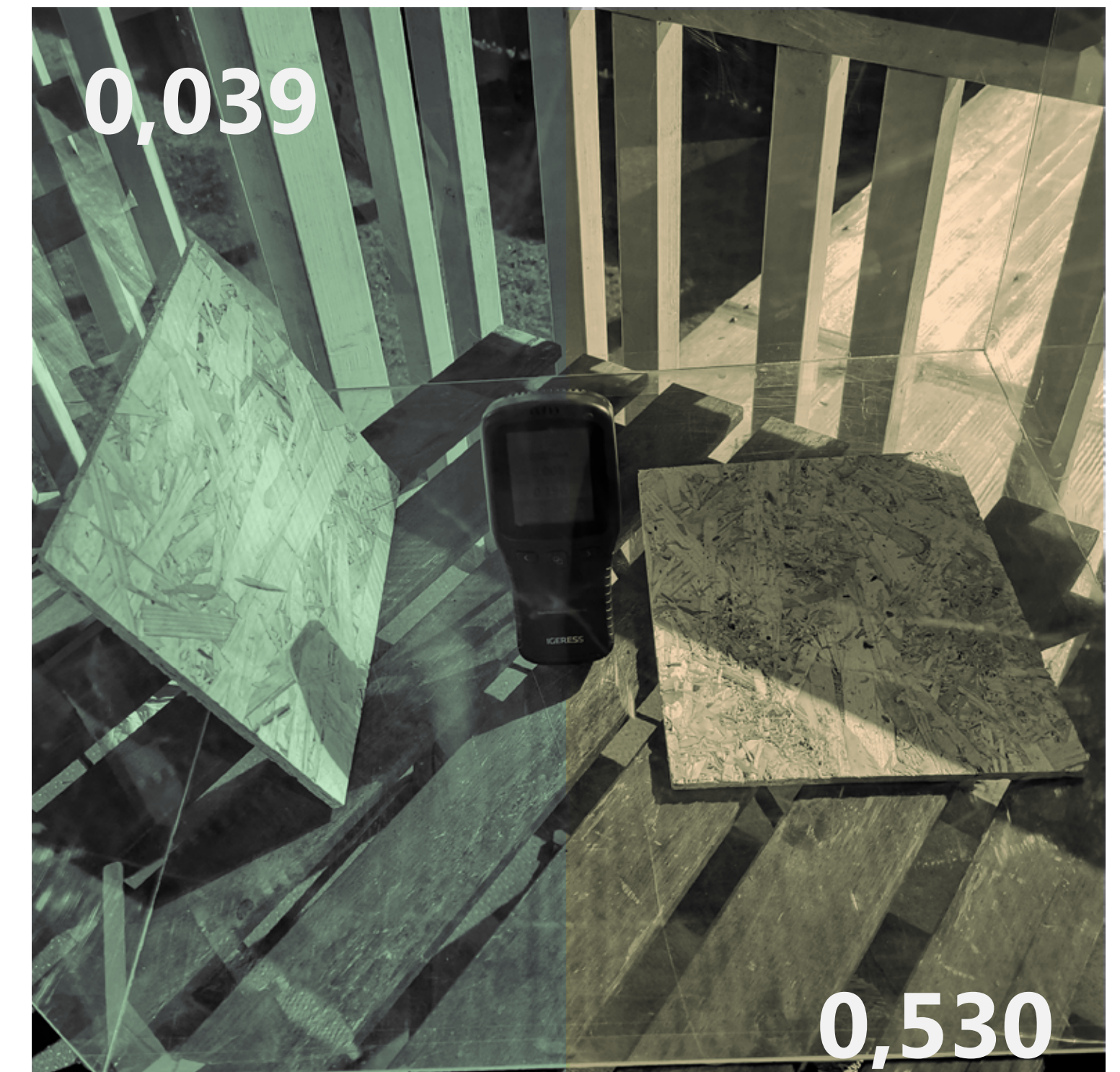


MDF 12 mm

# Puit

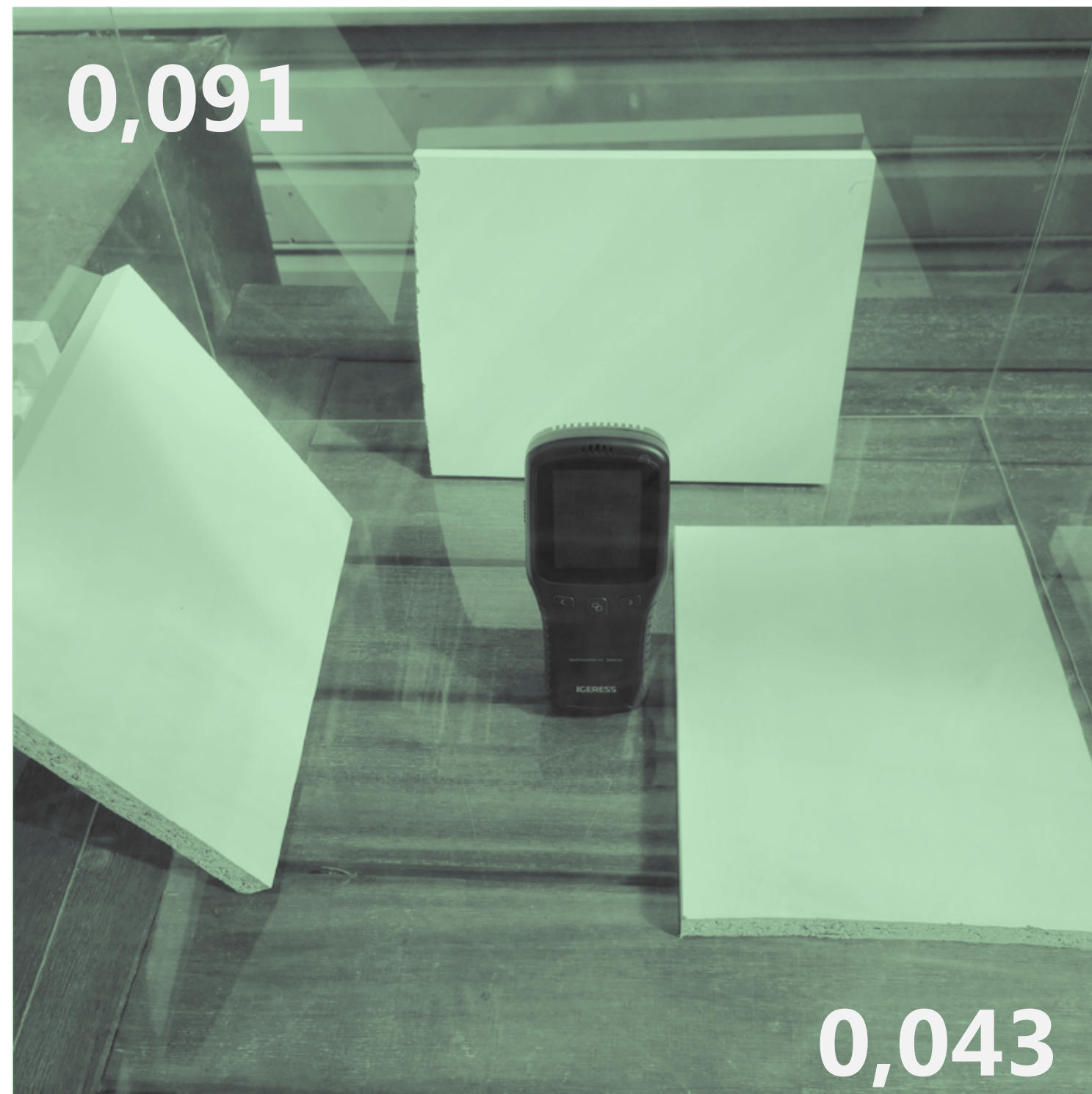


MDF 12 mm

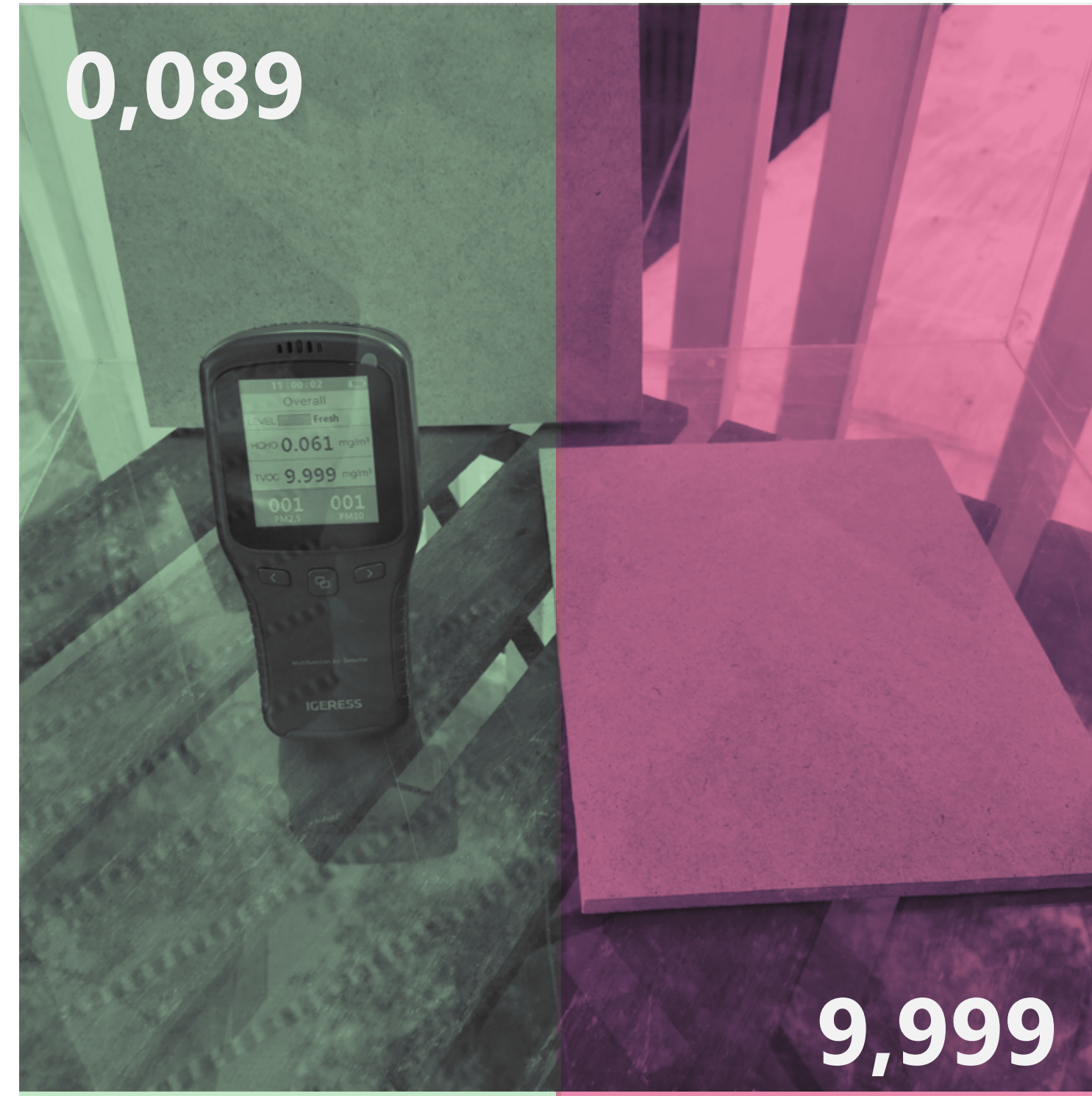


OSB 18 mm

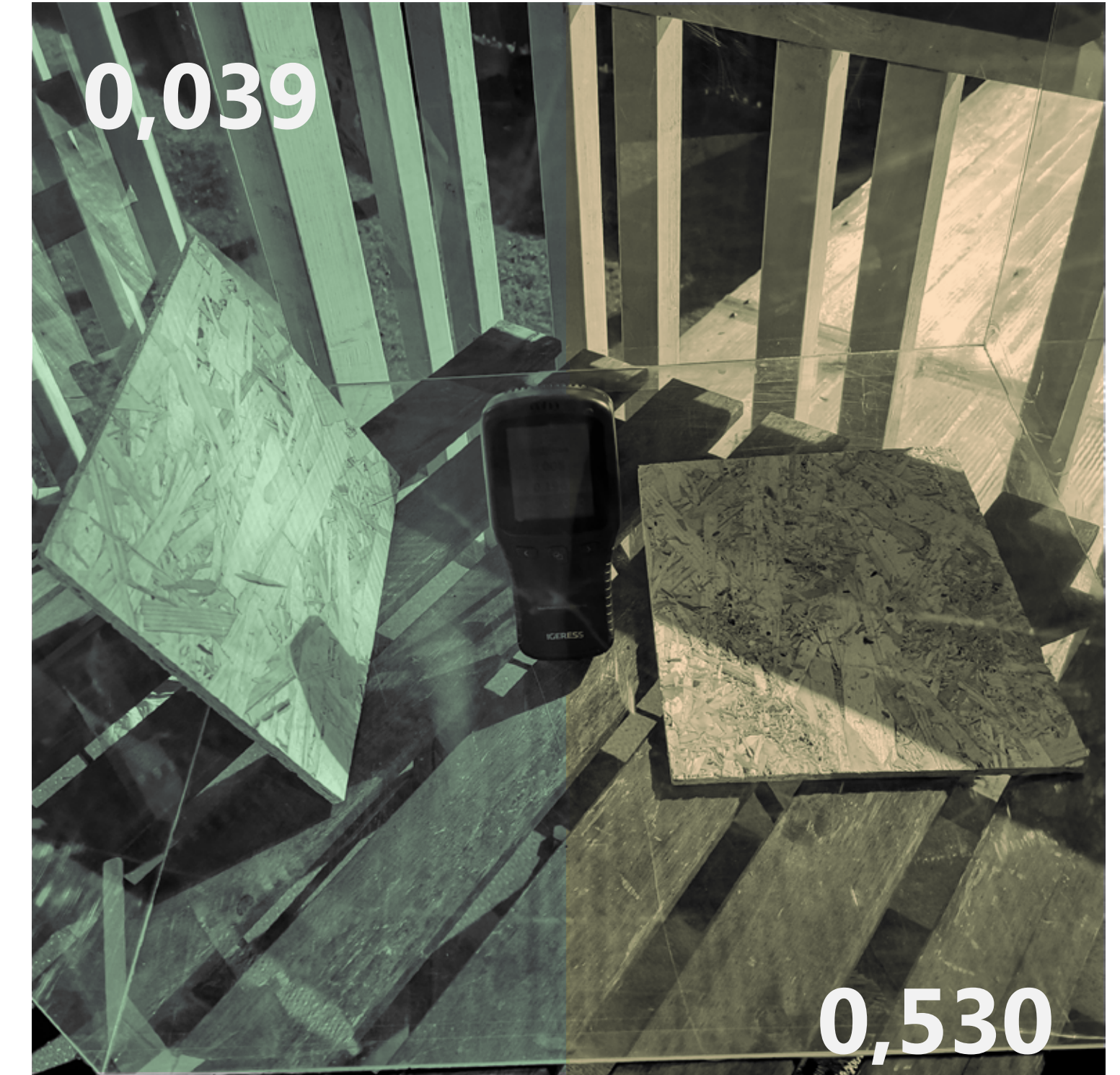
# Puit



Lamineeritud puitlaastplaat 16 mm

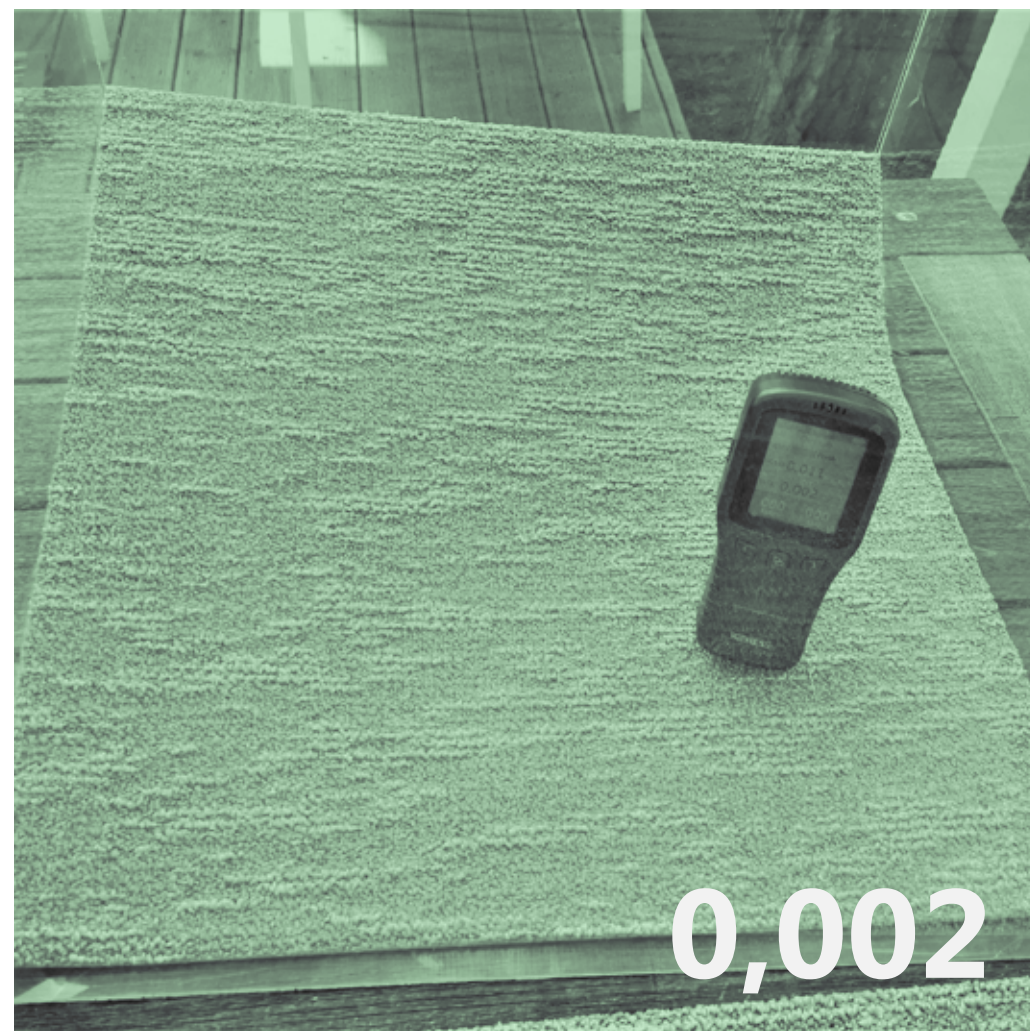


MDF 12 mm

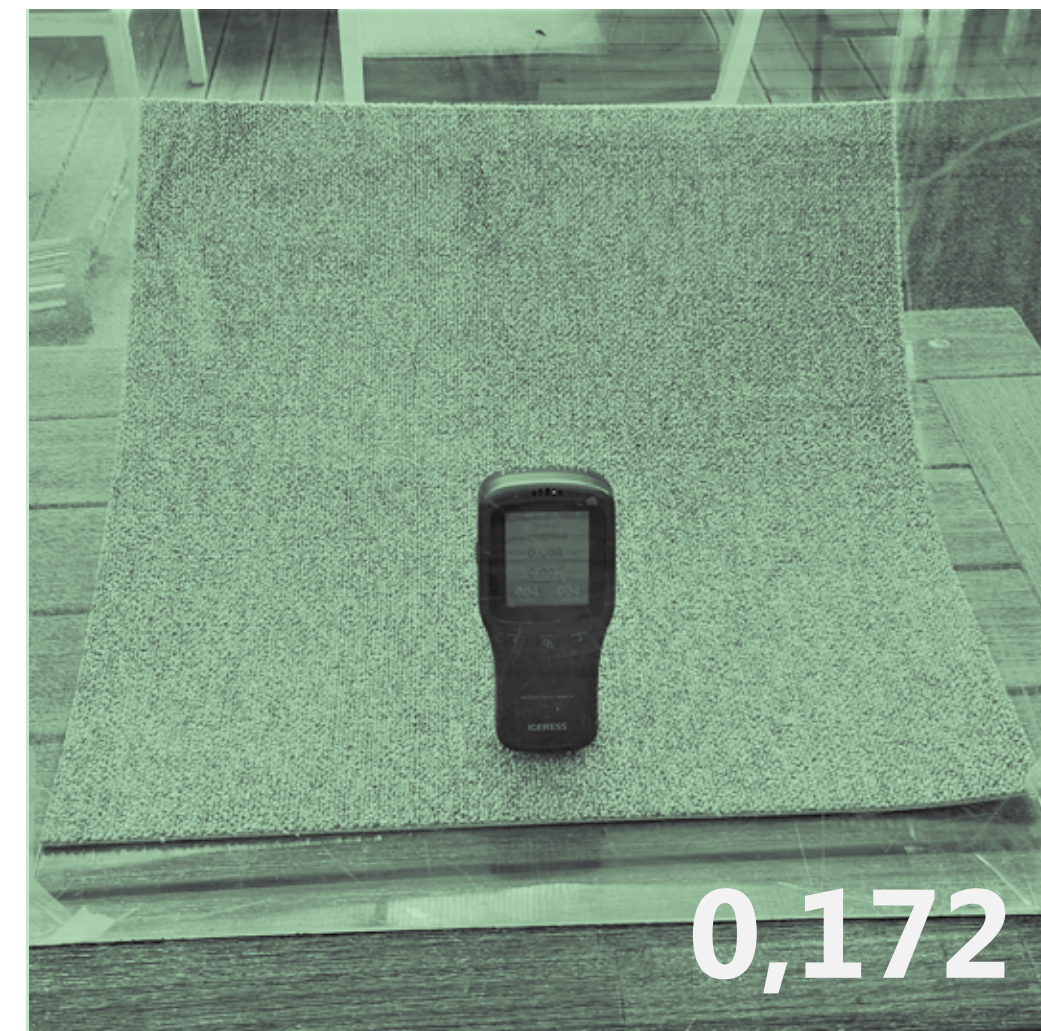


OSB 18 mm

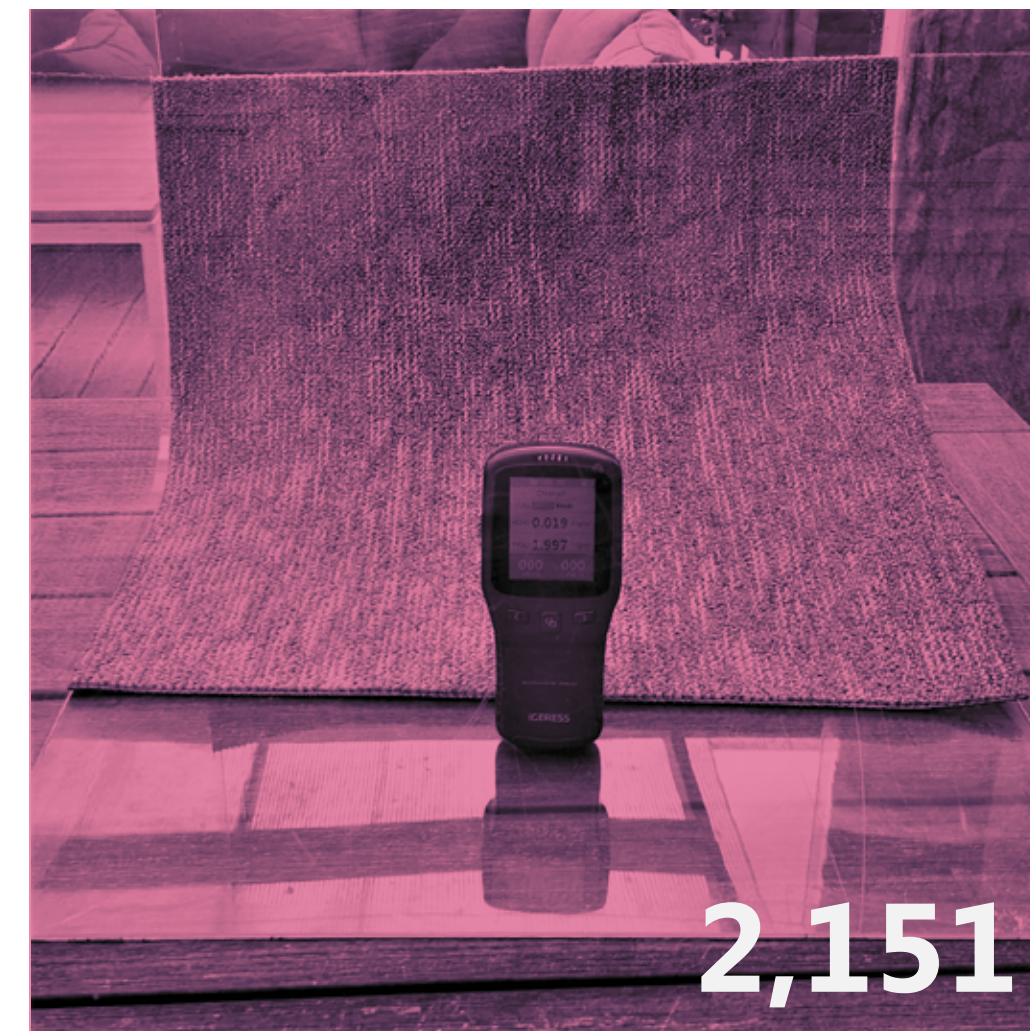
# Tekstil



Vaip  
Desso Wave Ecobase



Vaip  
Desso Stratos

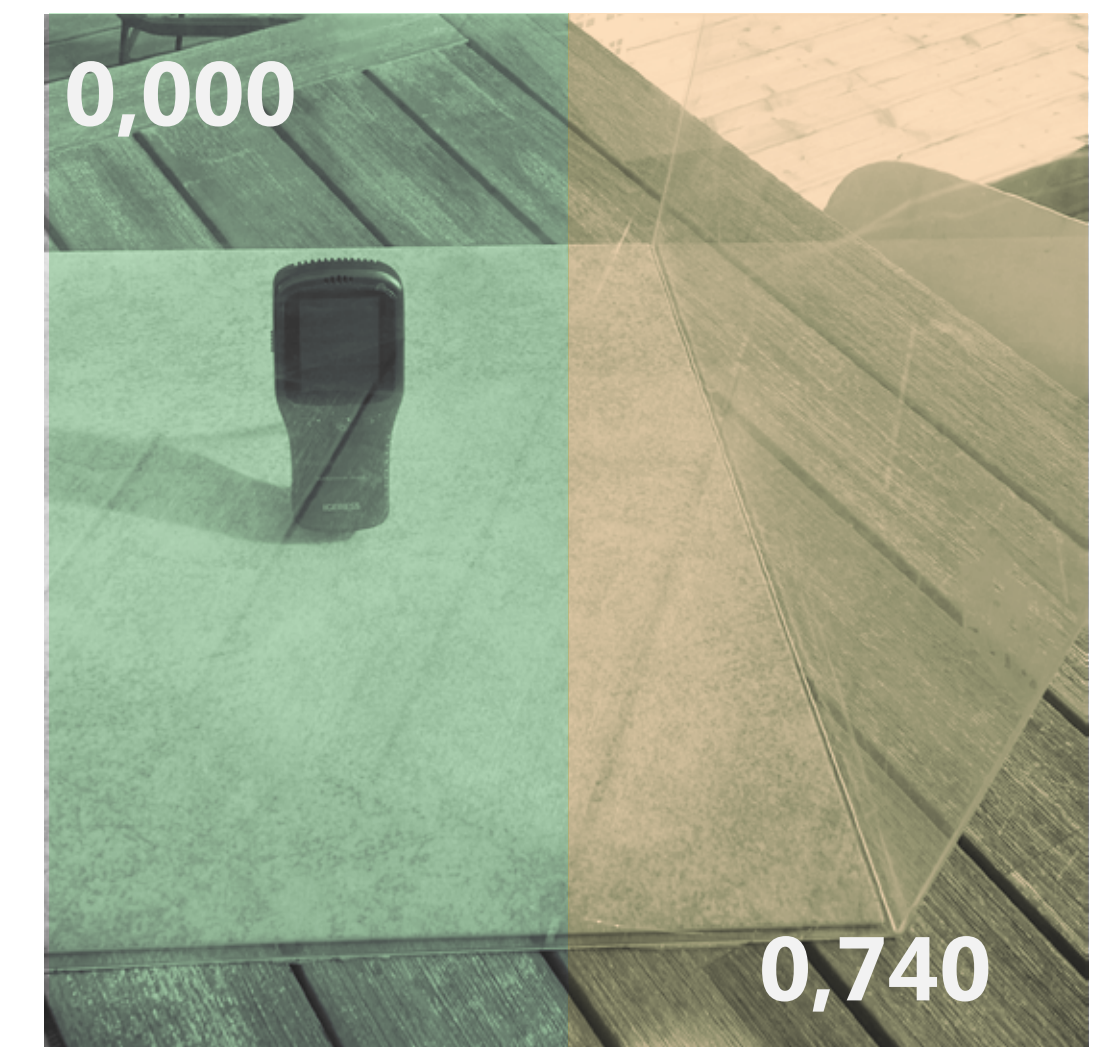
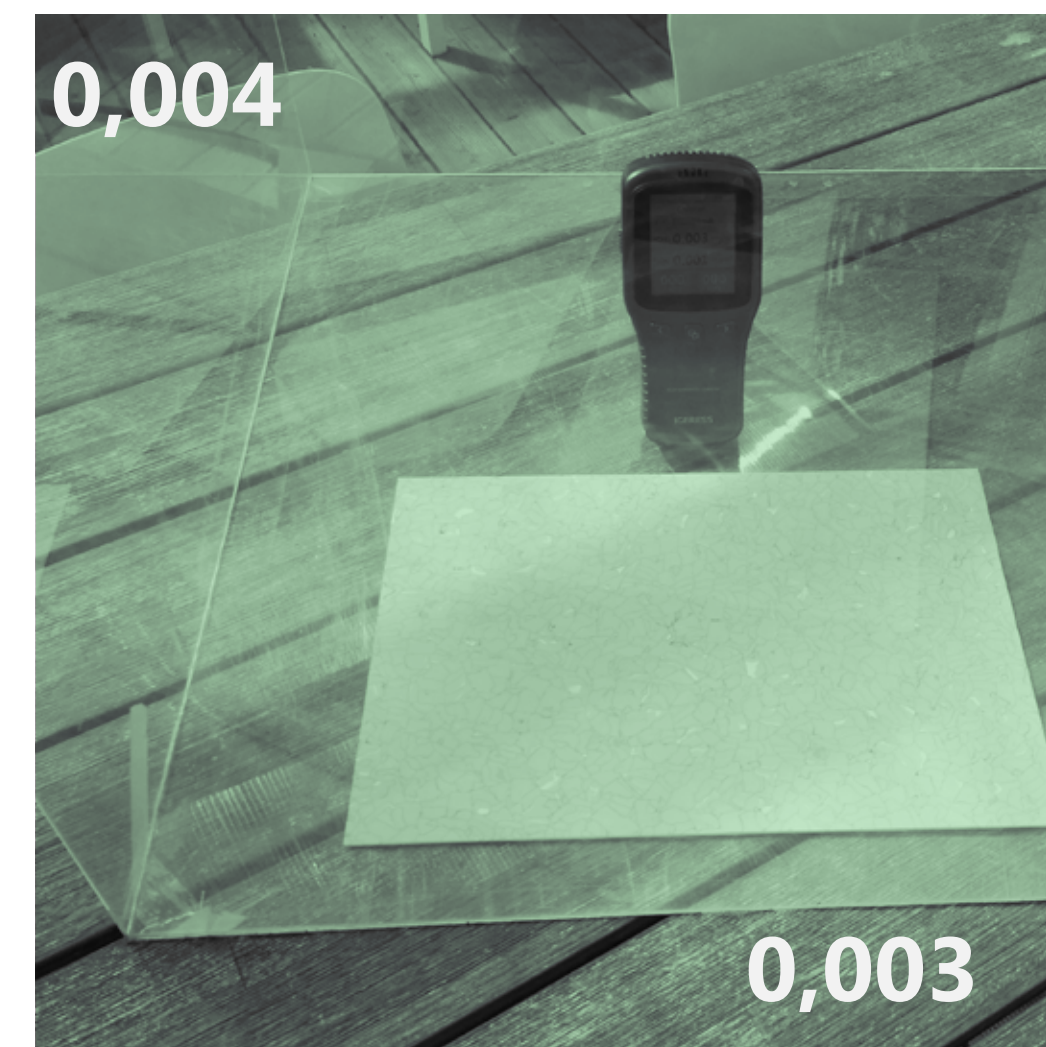
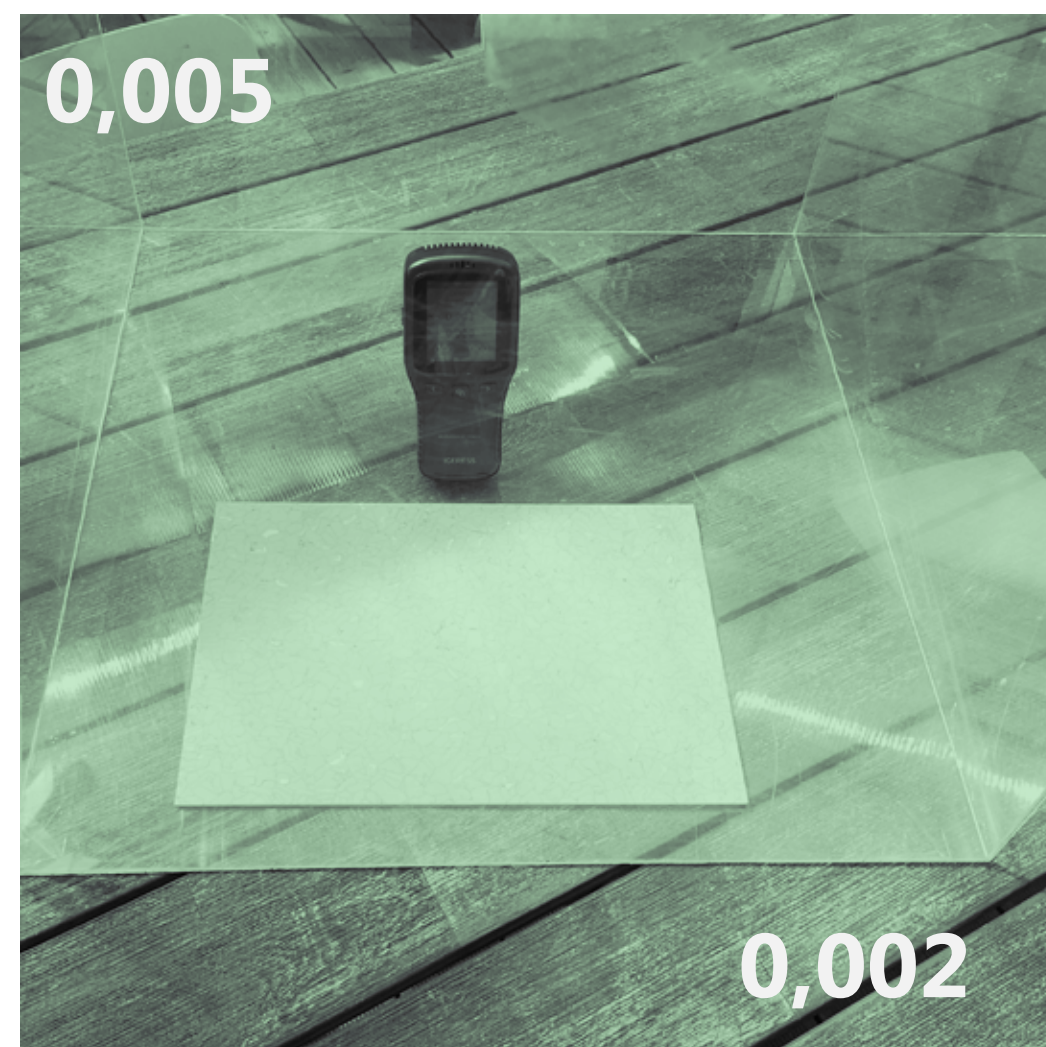


Vaip  
Desso Grain



Kardin  
Delius Orbit

## Polüvinüülkloriid ehk PVC



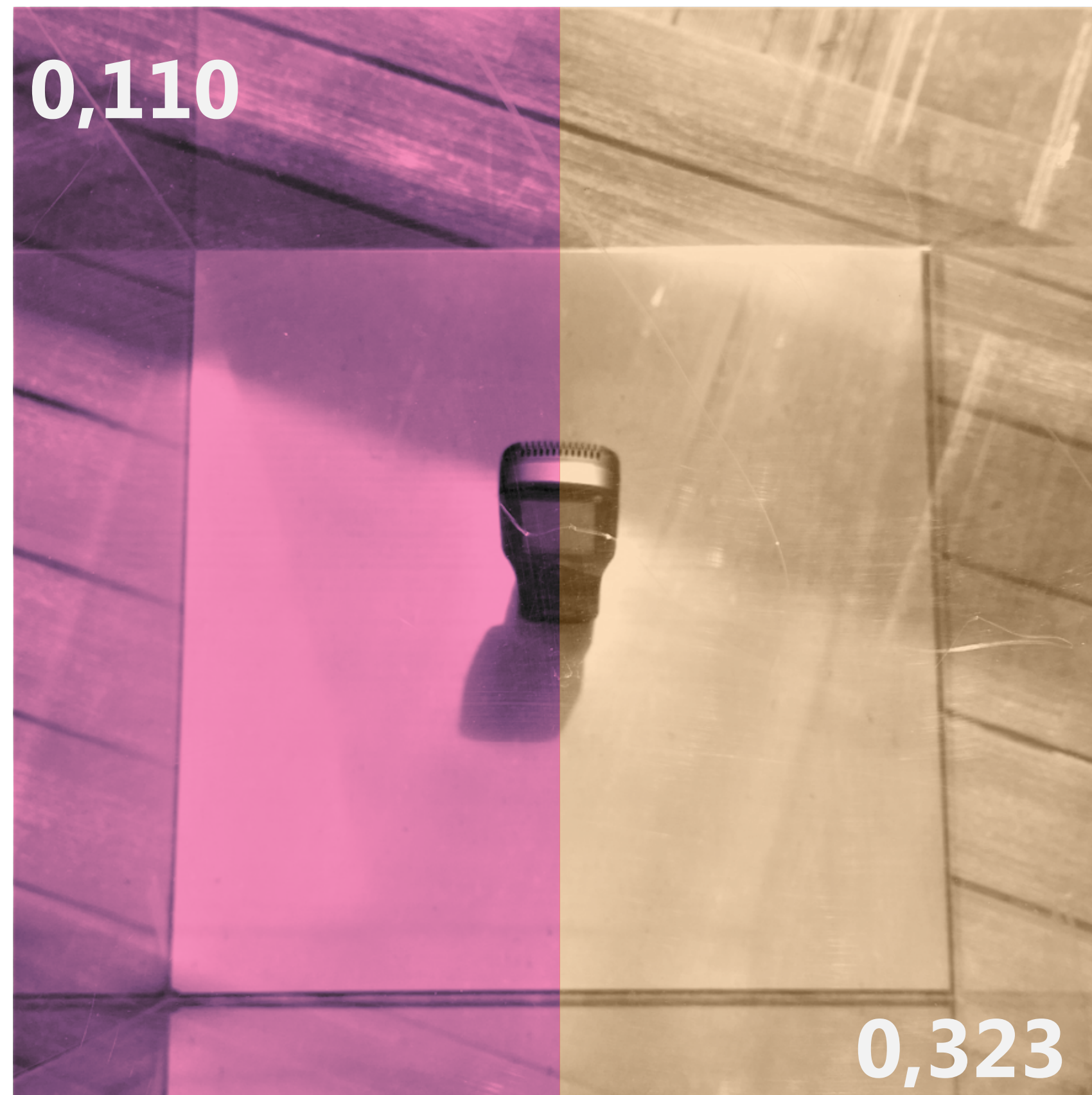
Forbo Colorex EC

Forbo Sphera Evolution

Forbo Sarlon Sparkle

Forbo Flotex

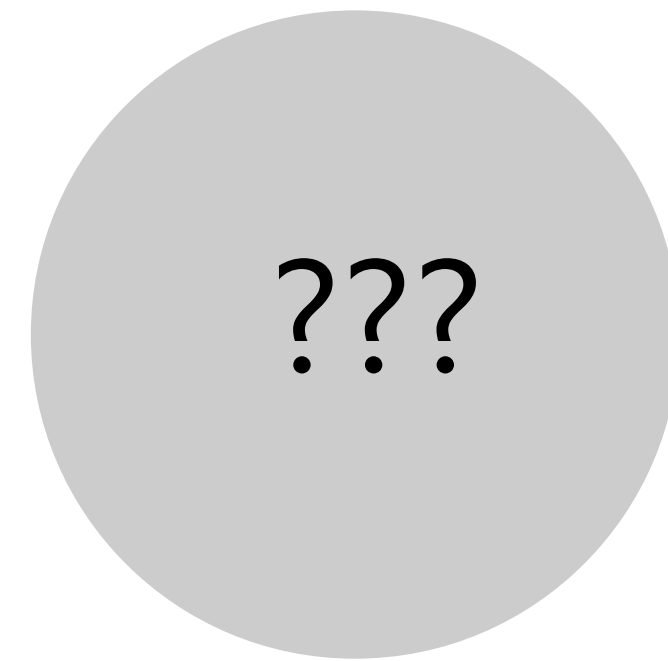
# Marmoleum



Forbo Piano

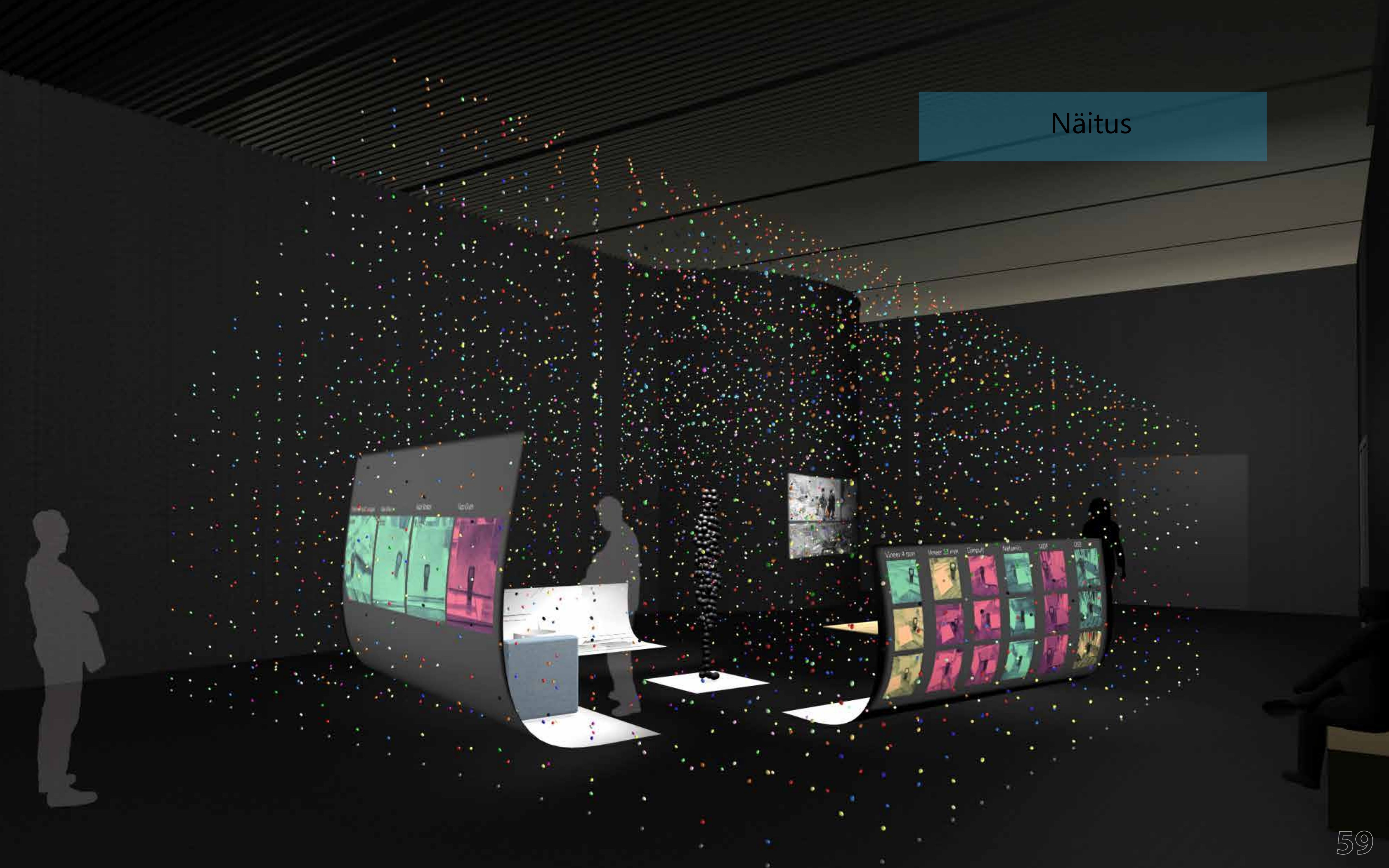


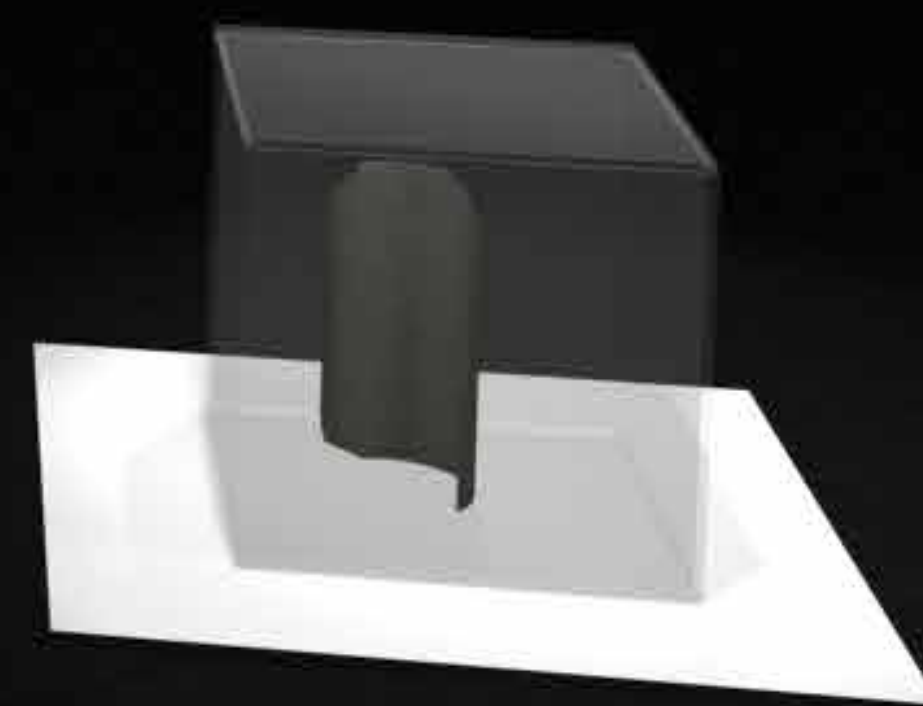


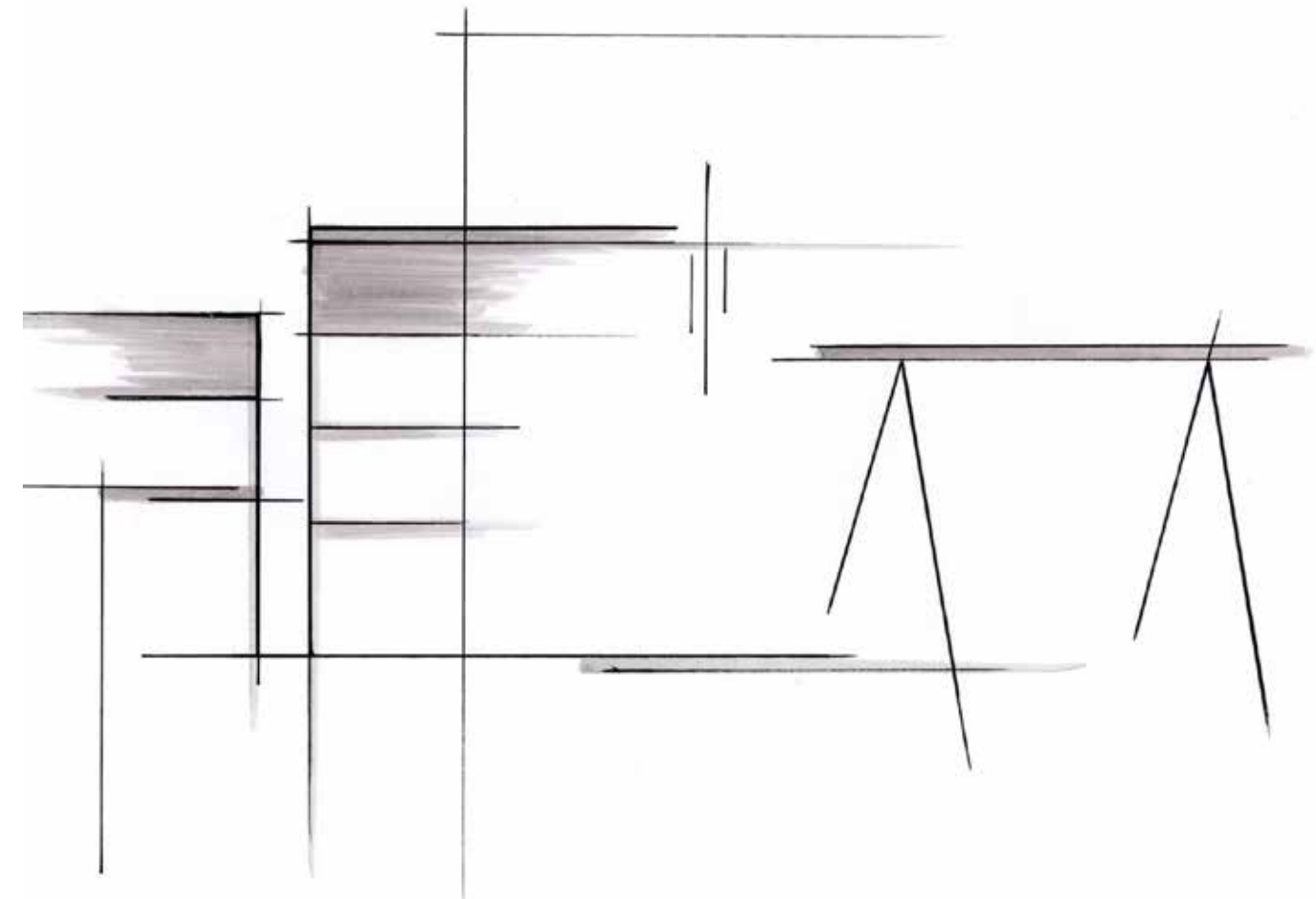


**Edasine suund - magistritöö**

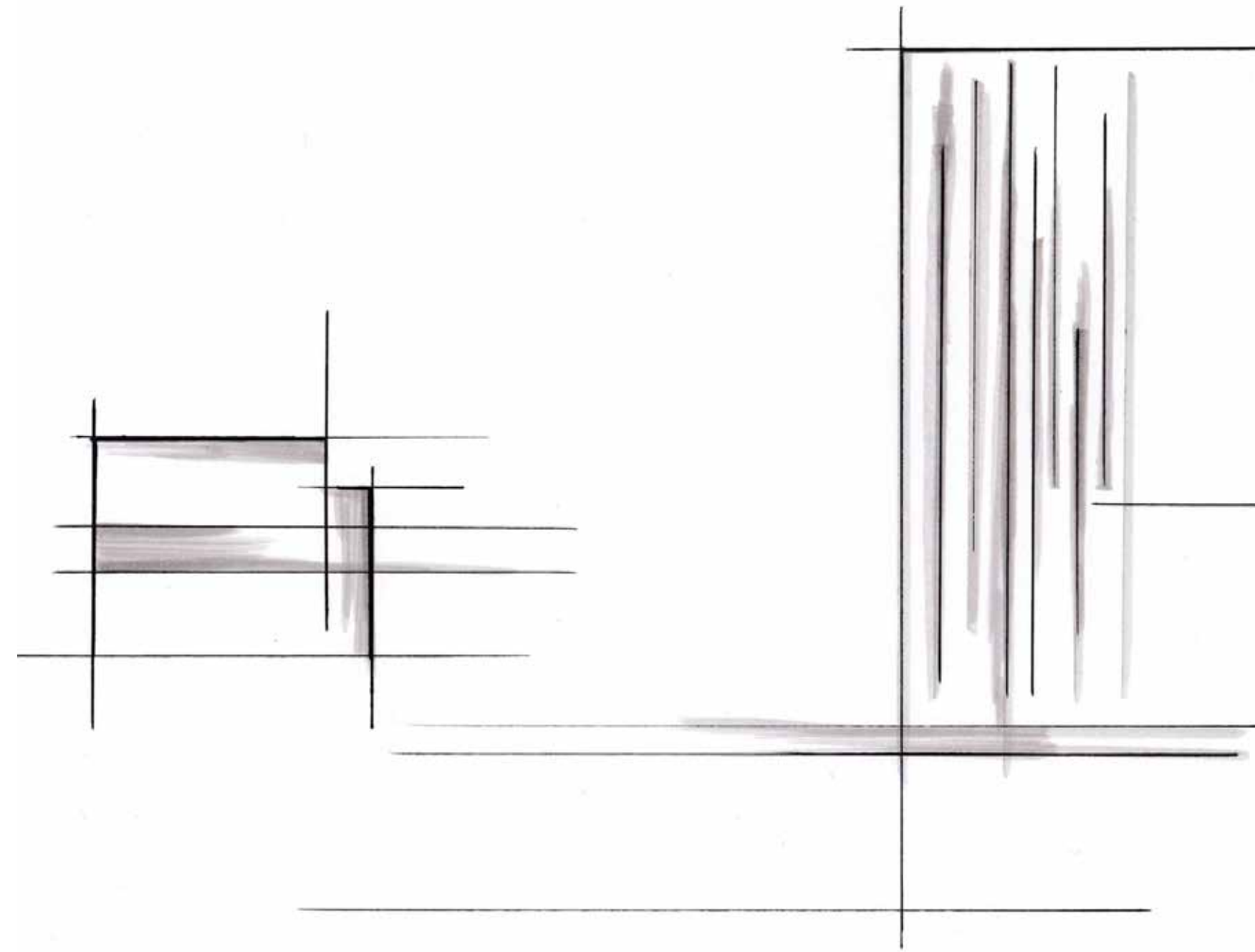
# Näitus



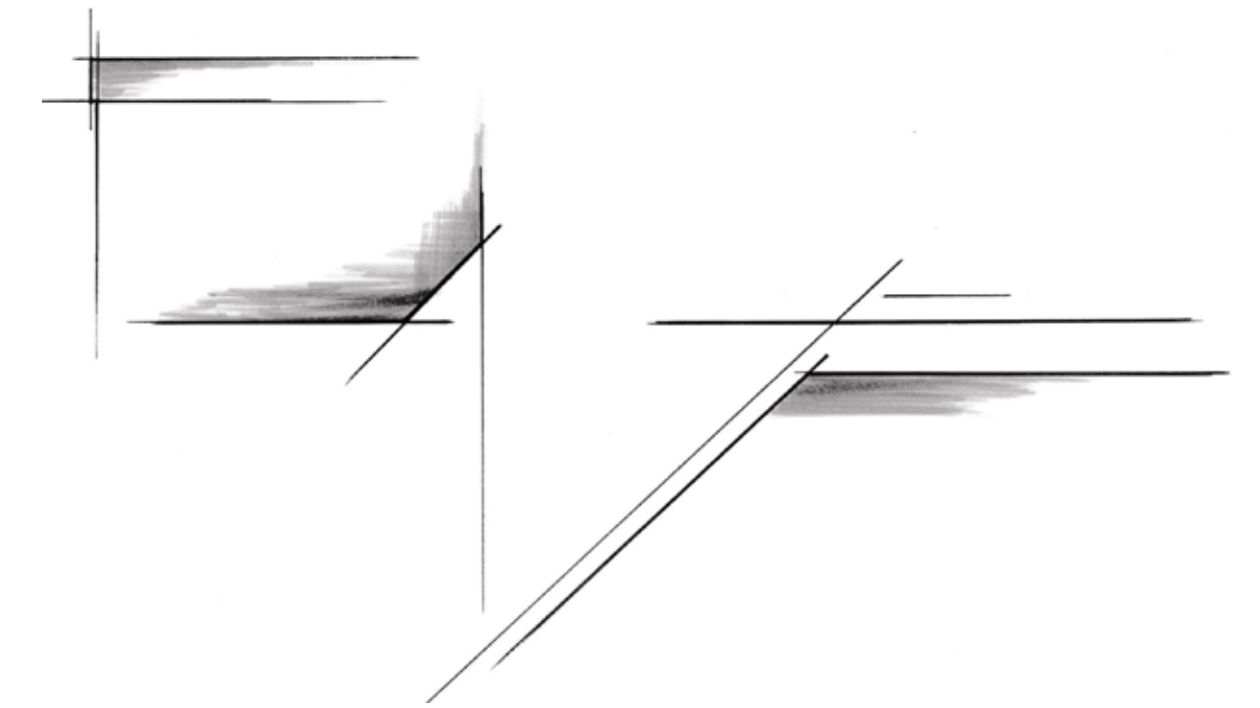




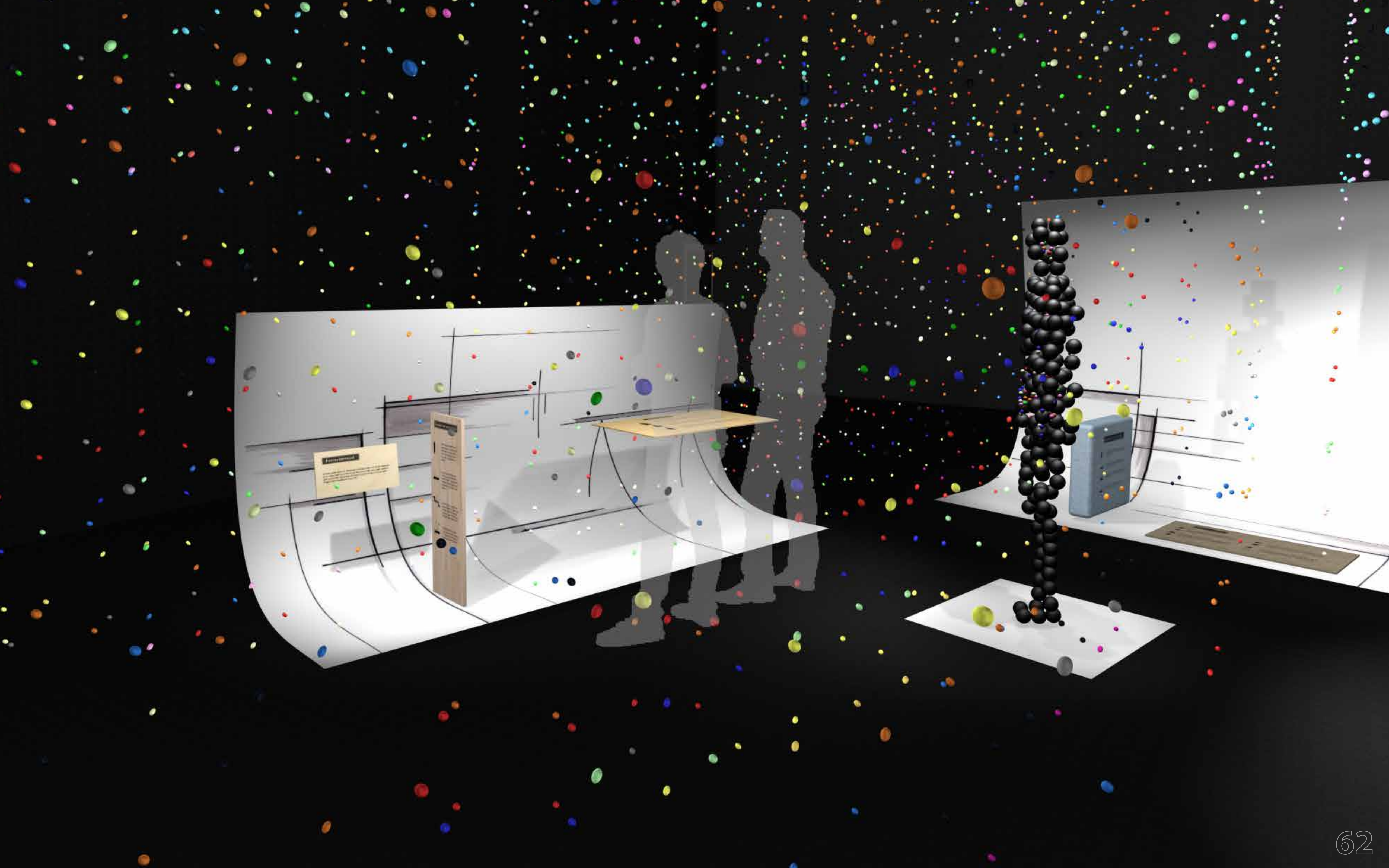
Puit



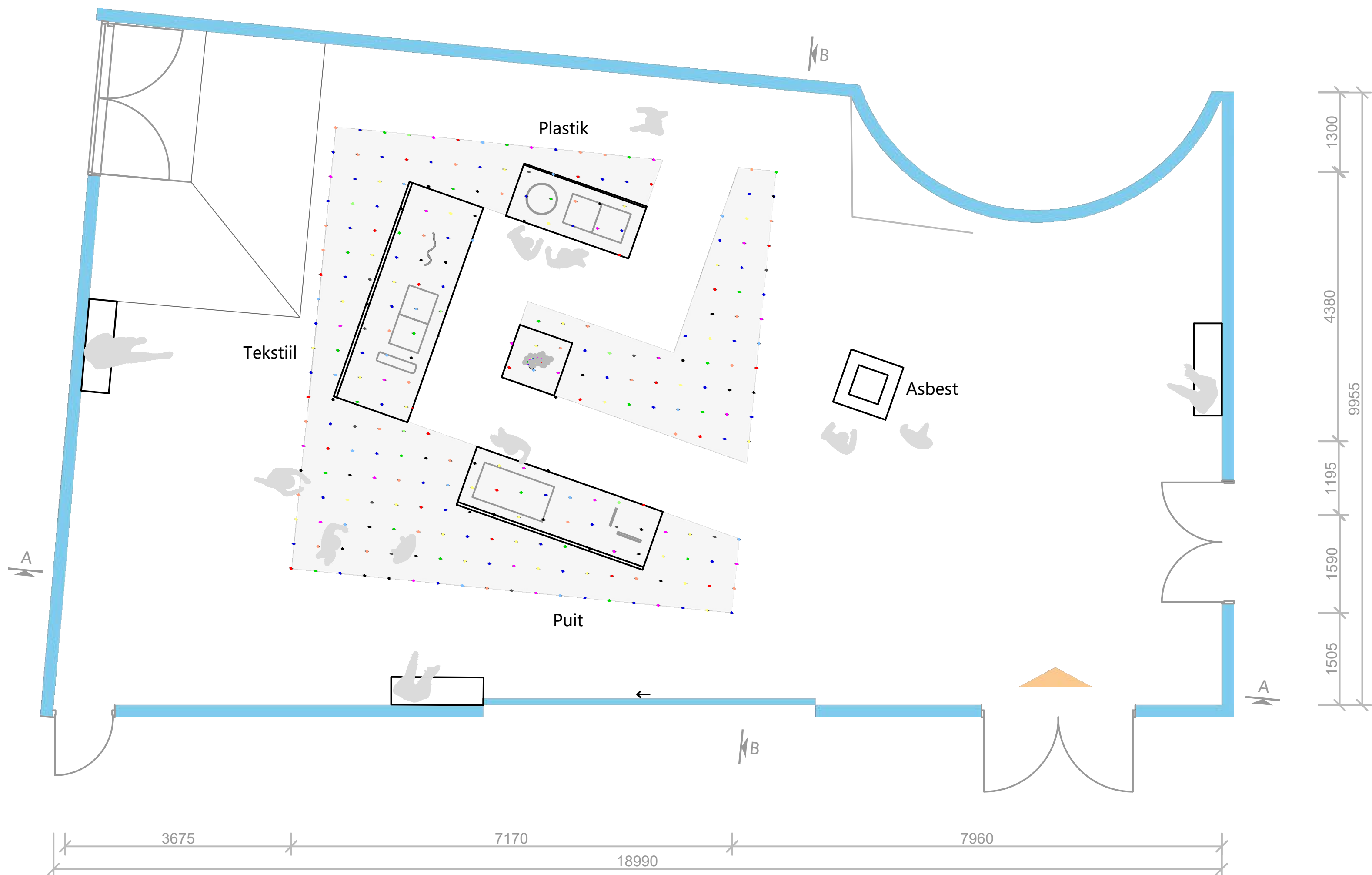
Tekstiel



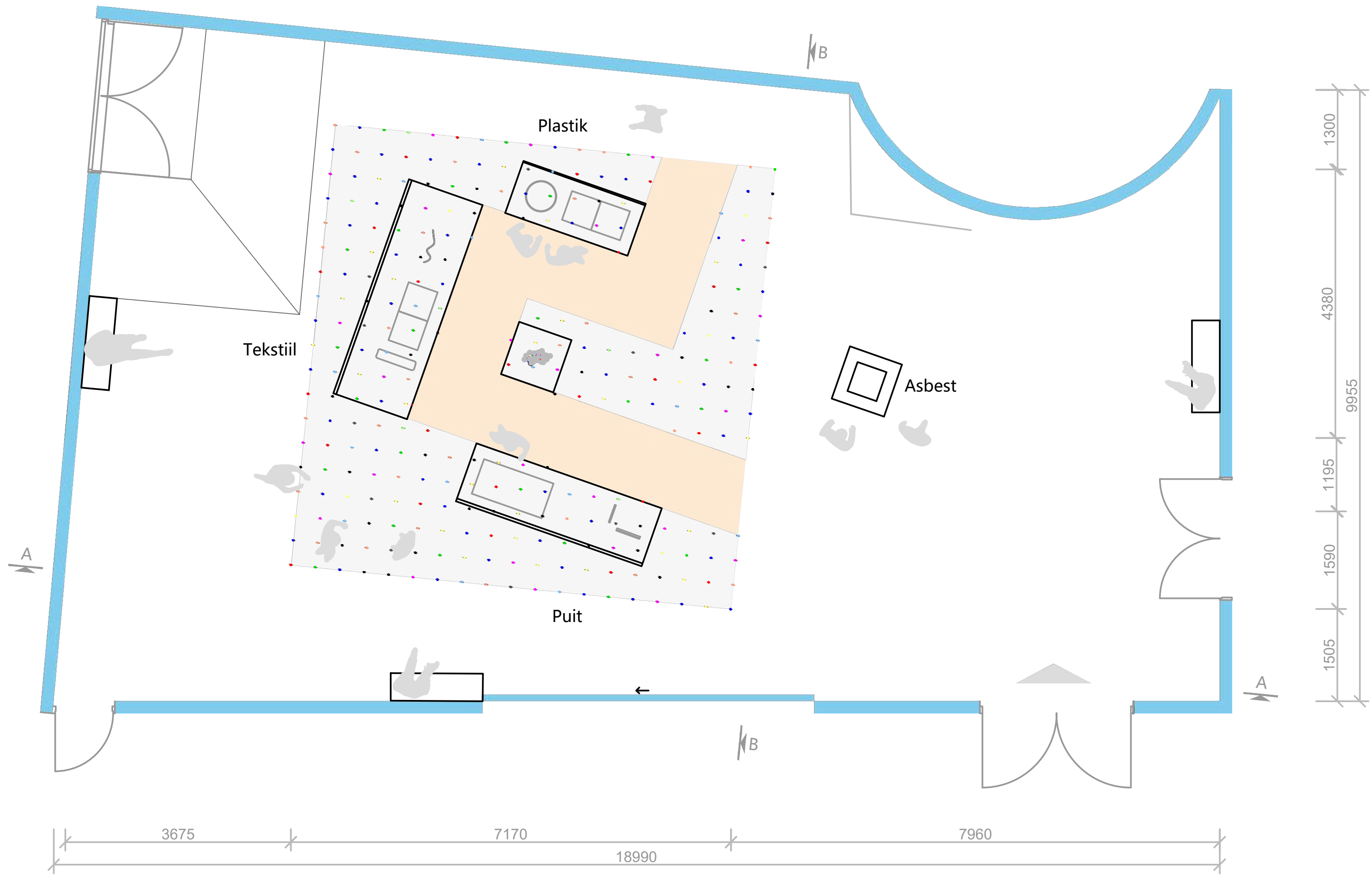
Plastiek



PLAAN

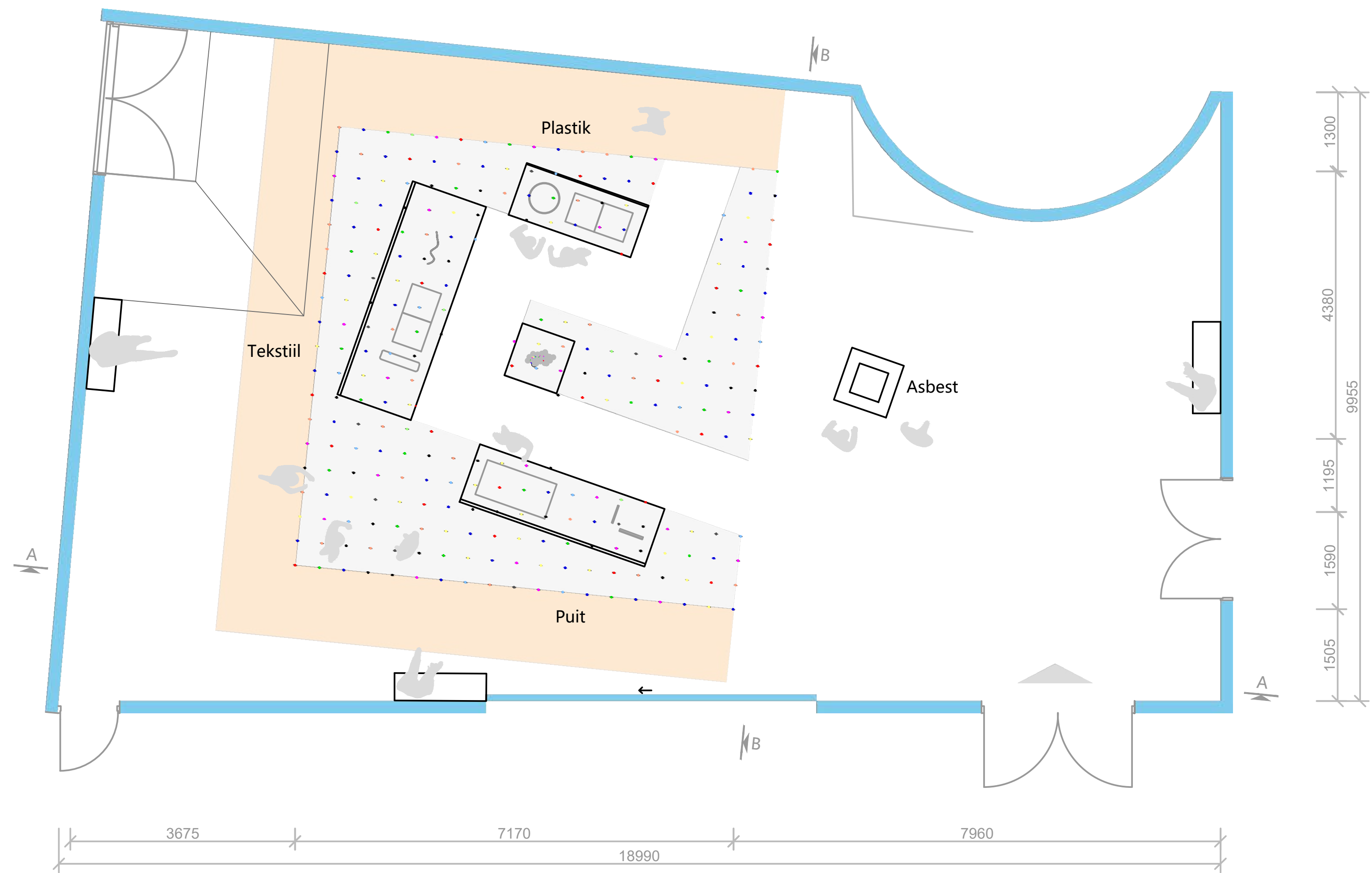


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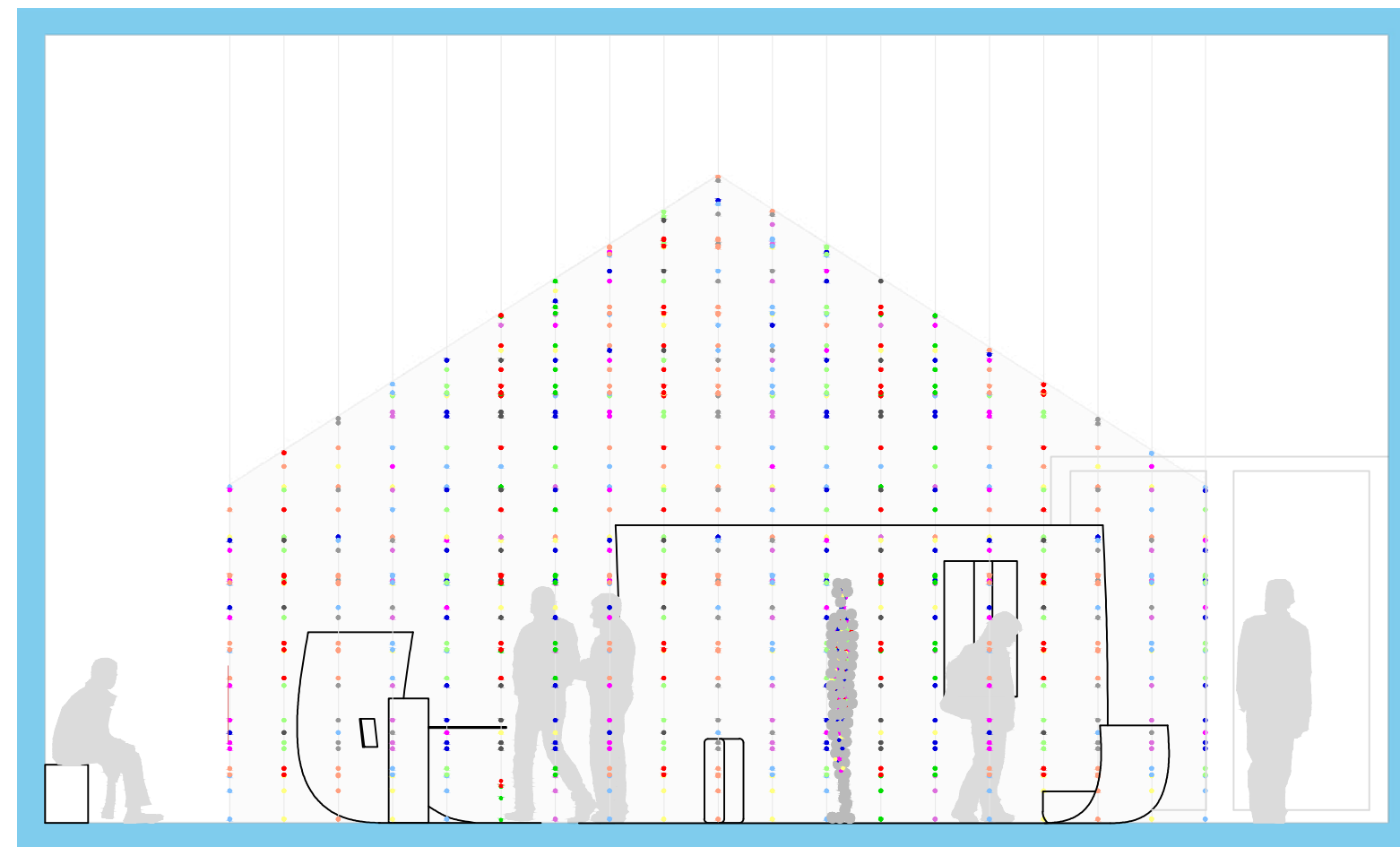




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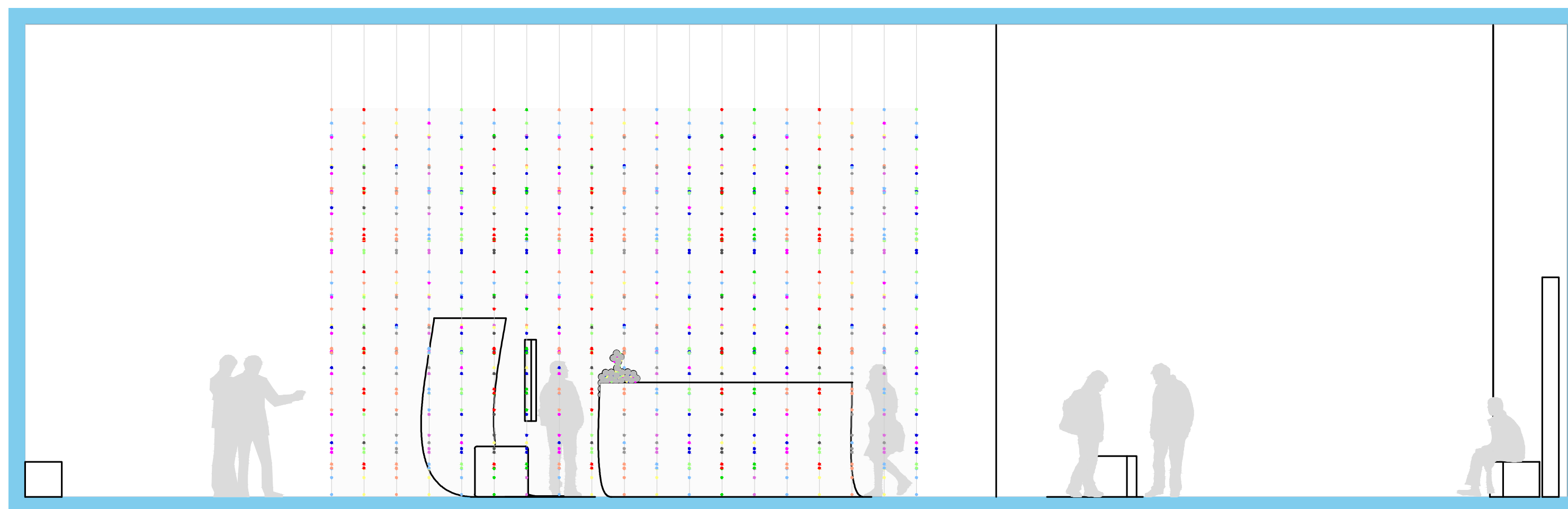


LÖIGE B-B



- +5.8 m
- +4.8 m
- +2.2 m
- +1.4 m
- +0.7 m
- +0.0 m

LÖIGE A-A



- +5.8 m
- +4.8 m
- +2.2 m
- +1.4 m
- +0.0 m