Dust exsposure
I-Mat
In the work zone and rand zone

Test conducted Januar 22, 2020

Vurdering av av støveksponering

Arbeid med termisk isoleringsmateriale
Aerogel, I-mat 220 og 650
IFA Tech – Stavanger

RAPPORT FRA STAMINA HELSE

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3 Tests – Worst Case

Sampling of particles in the working atmosphere with focus on

- To perform mounting
- To perform mounting and demounting

The following products / work tasks were tested

- I-Mat without foil, mounting
- I-Mat with foil, mounting
- I-Mat with foil, mounting and demounting

Standard test rig for insulation.

Habitat

Habitat inside

Habitat outside

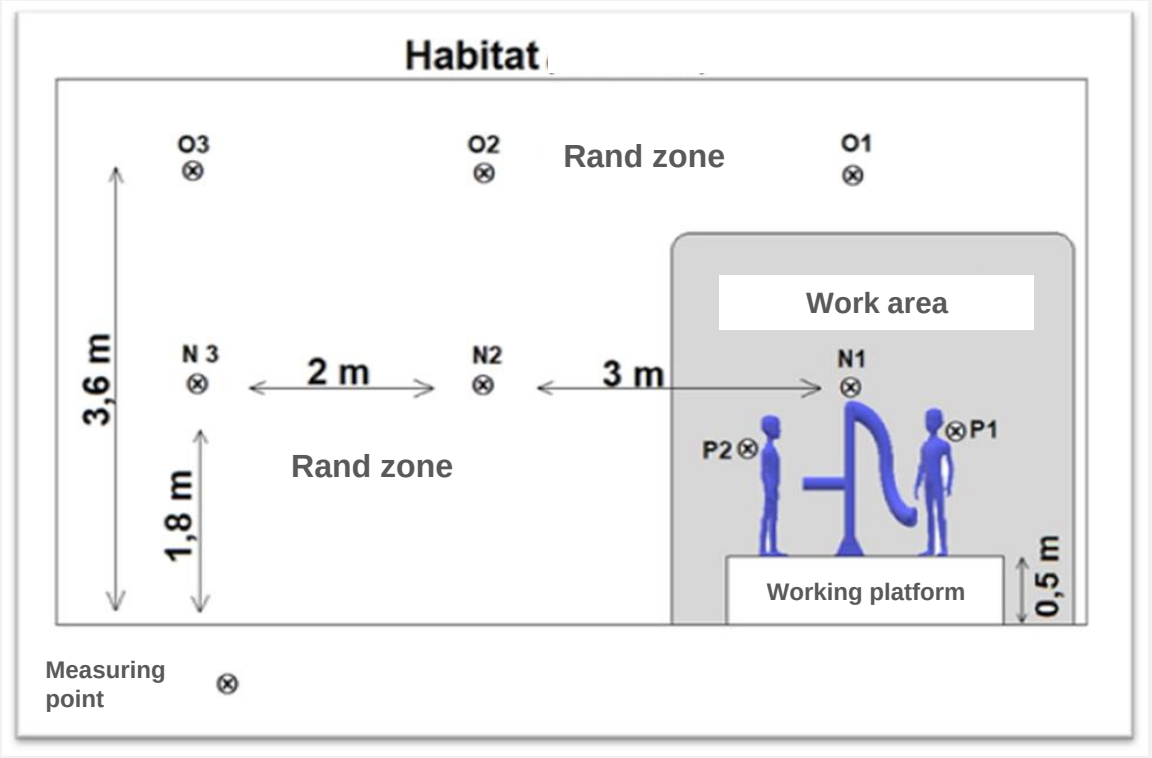
Width 4 meters, length 8 meters and height 4 meters. Test rig located 50 cm above floor. Temperature 15 ° - 17 ° C. Tight - no air circulation.

The sampling strategy

The sampling strategy includes both personal exposure of two insulators during the work, and stationary sampling in their work zone.

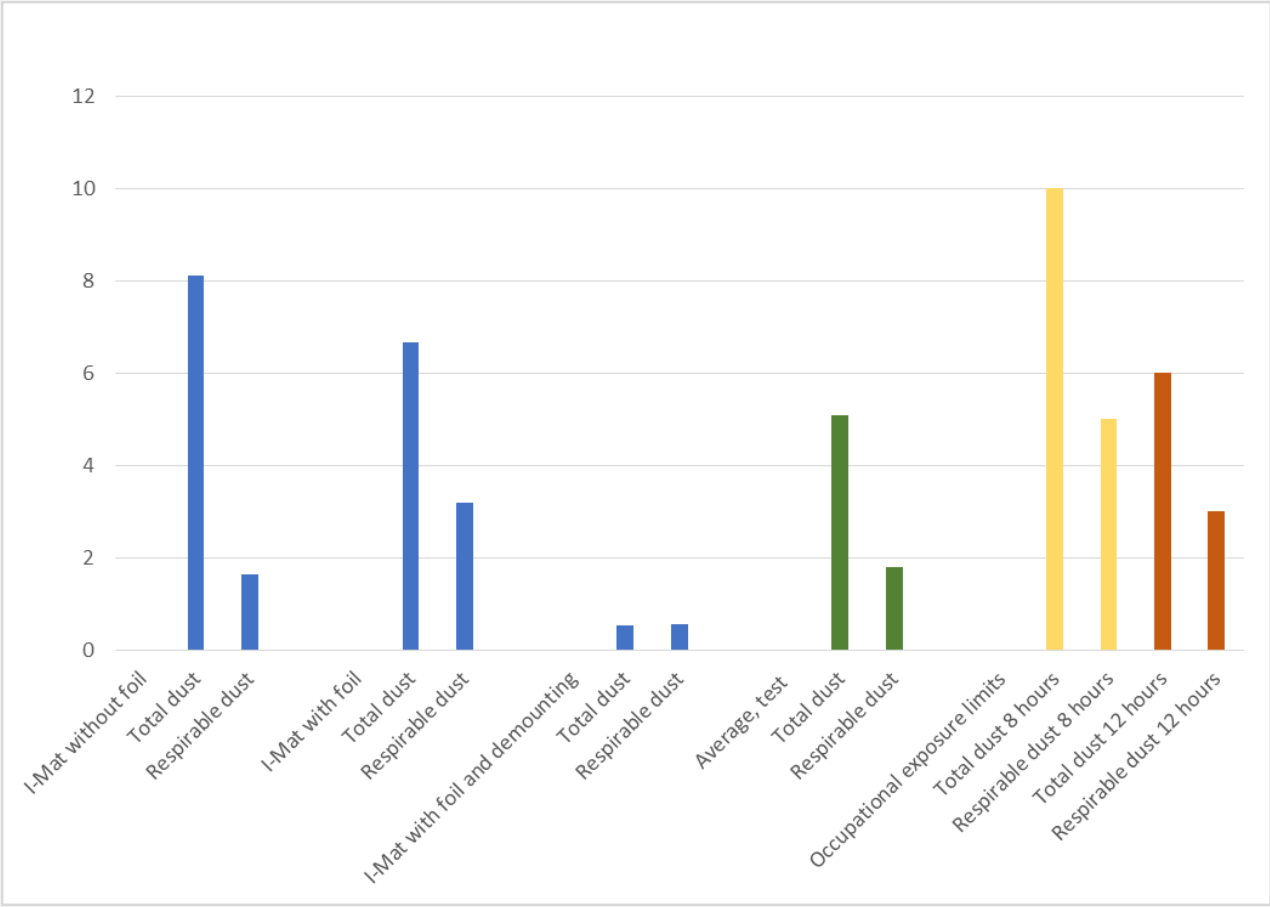
In the rand zone, both horizontally and vertically.

Personal exposure sampling of the insulators is central to this test.



Personal exposure sampling

Personal exposure sampling, average	
I-Mat without foil	**mg/m³**
Total dust	8,10
Respirable dust	1,65
I-Mat with foil	**mg/m³**
Total dust	6,65
Respirable dust	3,20
I-Mat with foil and demounting	**mg/m³**
Total dust	0,53
Respirable dust	0,56
Average, test	**mg/m³**
Total dust	5,09
Respirable dust	1,80
Occupational exposure limits	**mg/m³**
Total dust 8 hours	10
Respirable dust 8 hours	5
Total dust 12 hours	6
Respirable dust 12 hours	3



Test 1: I-Mat without foil, mounting

Systematic work. Some rough handling when fitting insulation.

It is pointed out that this creates dust in the work area.

Cutting is mainly done on the vessel, somewhat on the floor.

Adjusting/cutting on the vessel is below the stationary measuring points N1 / O1.

I-Mat, without foil	Personal sampling 1	Personal sampling 2	Measuring point N	Measuring point N 3 meter	Measuring point N 5 meter	Measuring point O	Measuring point O 3 meter	Measuring point O 5 meter
Total dust	6,2	10	5,4	1,9	2,4	4,8	2,7	2,3
Respirable dust	1,2	2,1	2,4	1	1,1	2,2	0,8	1

Visual check shows little visible dust.

Test 2: I-Mat with foil, mounting

Systematic work. Some rough handling when fitting insulation.

It is pointed out that this creates dust in the work area.

Cutting is mainly done on the vessel, somewhat on the floor.

Adjusting/cutting on the vessel is below the stationary measuring points N1 / O1.

I-Mat with foil	Personal sampling 1	Personal sampling 2	Measuring point N	Measuring point N 3 meter	Measuring point N 5 meter	Measuring point O	Measuring point O 3 meter	Measuring point O 5 meter
Total dust	6,8	6,5	4,2	2,4	3,2	5,4	3,8	2,2
Respirable dust	3,7	2,7	1,7	1,3	0,5	1,9	1,6	1,8

Visual check shows little visible dust

Test 3: I-Mat with foil, mounting and demounting

The work is carried out in accordance with IPS and IFA Tech procedure for handling I-Mat.

Cutting and adaptation takes place on a separate table in the habitat.

Everything central to the test rig under the N1 / O1 measuring points was isolated.

I-Mat with foil and demounting	Personal sampling 1	Personal sampling 2	Measuring point N	Measuring point N 3 meter	Measuring point N 5 meter	Measuring point O	Measuring point O 3 meter	Measuring point O 5 meter
Total dust	0,3	0,8	0,3	0,4	0,2	0,4	0,3	0,4
Respirable dust	0,7	0,4	0,4	0,4	0,4	0,6	0,5	0,4

Visual check shows little visible dust

Cutting table in habitat

Analysis «worst case» scenario

Measurement results	Comments
< 25 % of OEL	The result indicates that the exposure is clearly below the limit value (OEL), and that this also applies to other employees in the group.
> 25 % of OEL - < 150 % of OEL	When measuring results above 25% of the limit value, it cannot be said with certainty that the exposure is below the limit value.
> 150 % of OEL	Exposure is clearly above the limit value. Necessary measures to improve the situation must be implemented. A new measurement shall be made after measures have been implemented

Occupational exposure limits

What	Norway 8 hour (mg/m³)	Norway 12 hour (mg/m³)
Irritating dust - total dust	10	6
Irritating dust - respirable dust	5	3

Regulations concerning action and limit values (Lovdata, reference 2)

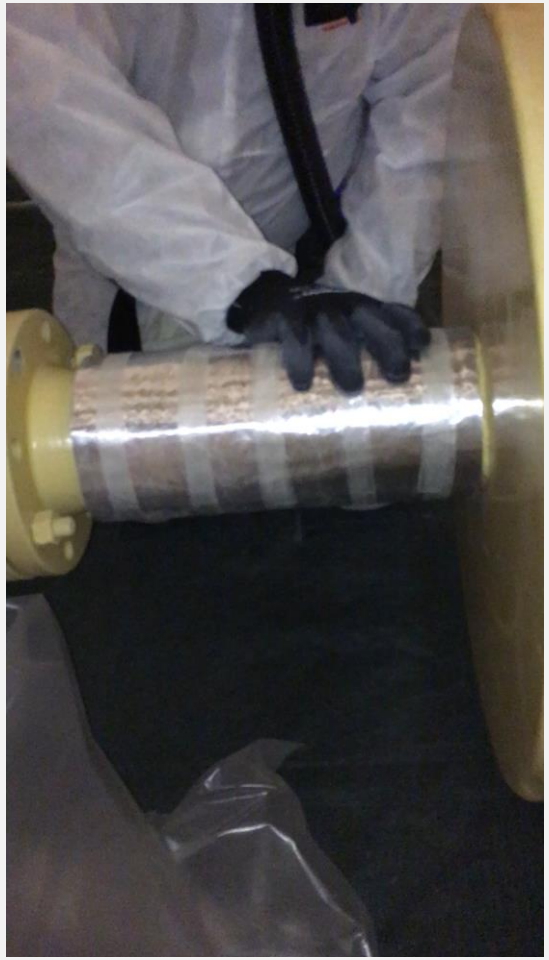
	Total dust			Respirable dust		
	Average [mg/m³]	% of OEL 8-hours	% of OEL 12-hours	Average [mg/m³]	% of OEL 8-houers	% of OEL 12-hours
Personal exposure 1	4,4	44	74	1,9	38	63
Personal exposure 2	5,8	58	97	1,7	34	57
Measuring point N	3,3	33	55	1,5	30	50
Measuring point N – 3 meter	1,6	16	27	0,9	18	30
Measuring point– 5 meter	1,9	19	32	0,7	14	23
Measuring point O	3,5	35	58	1,6	32	53
Measuring pointO – 3 meter	2,3	23	38	1,0	20	33
Measuring point O – 5 meter	1,6	16	27	1,1	22	37

Measurement result and limit value

Measurement results in relation to OEL are stated and colored according to the assessment criteria. The average value of the individual measurement point, is stated in mg/m³ and listed in relation to the actual OEL in %, both 8 and 12 hours working day.

Mounting I-Mat

Demounting of I-Mat



Visual inspection after I-Mat was removed

Little visible dust after removing I-Mat

Vessel was wiped off with a rag to reveal dust that was released during mounting and demounting I-Mat

I-Mat

I-Mat was delivered packed

I-Mat with foil

Conclusion

I-Mat has little dust.

I-Mat creates little dust when working with the product.

Best results is achieved by following *IFA Tech's I-Mat Handling Procedure and Piping IPS I-Mat.*

Occupational exposure limits	Total dust			Respirable dust		
I-Mat with alu folie	Average [mg/m³]	% of OEL 8 hours	% of OEL 12 hours	Average [mg/m³]	% of OEL 8 hours	% of OEL 12 hours
Personal exposure 1	0,3	3	5	0,7	14	23
Personal exposure 2	0,8	8	13	0,4	8	13
Measuring point N	0,3	3	5	0,4	8	13
Measuring point N - 3 meters	0,4	4	7	0,4	8	13
Measuring point N - 5 meters	0,2	2	3	0,4	8	13
Measuring point O	0,3	3	5	0,6	12	20
Measuring point O - 3 meters	0,4	4	7	0,5	10	17
Measuring point O - 5 meters	0,4	4	7	0,4	8	13