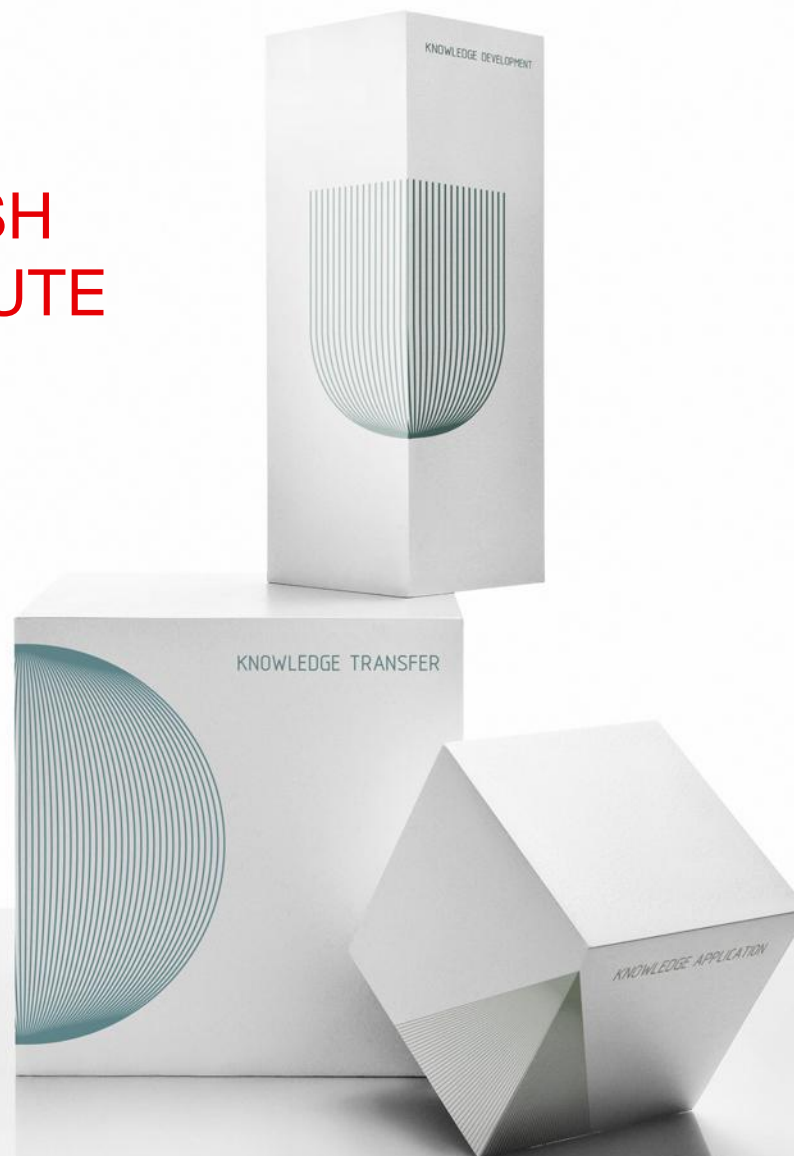




**DANISH
TECHNOLOGICAL
INSTITUTE**

WELCOME TO THE DANISH TECHNOLOGICAL INSTITUTE





DTI

- Non profit and independent
- Technological Service Institute
- SME focus
- Appx.1000 employees



NANO AT DTI

- Nanosurfaces (PCVD, Sol-Gel, Tribology)
 - Polymer nanocomposites
 - Product development
 - And more
-
- Skills needs identification
 - Foresight and sector analysis
 - Environmental, Health and Safety management



Greenbook on nanotechnology (DK)

- Toxicology: Reason for concern (carbon, TiO_2 , etc.)
- Exposure: We can setup interrim guidance and design effective controls
- Legislative : At progress, but still much work ahead
- Economic: good prospects, synergy with environmental and energy goals
- R&D: Health and safety is an agreed goal in many countries and R&D is progress.
- Industry: More can be done to communicate scientific results, and start to implement proactive safety guidelines



SKILLS NEEDS – industrial surface treatment operators

- Research themes:
 - Sectoral analysis
 - Technical, knowledge and EHS skills needs (VET)

- Tentative conclusion:
 - No basis for new formal technical educations due to
 - Incremental and adaptive innovation approach
 - Small dissemination of nanoproducts (partly due to uncertainties of HS)
 - Need for integration of nanoterminology, nanomaterials update, work environmental issues on existing educations

- First steps
 - Qualification of teachers
 - Business-to-business learning course



NanoSafer – Aim and research

Aim:

To give state of the art knowledge on nanosafety with regards to Danish industry and laboratory work

- Case studies and field measurements
- Good practice from production and laboratory
 - Paint industry
 - Enzyme and process industry
 - Concrete industry
 - Polymer industry
 - Industrial surface treatment
 - R&D og laboratory work
- International research mapping



NanoSafer - Tentative conclusions

- Still few productions containing high levels of nanoparticles
- High levels are identified when using nanoparticles (powder, suspension and bulk)
- Control Band method seems to be appropriate method
- Existing technical controls can work effectively if properly design and used
- Still many unknowns and an area full of surprises (exposure from suspensions)
- We can work progressively to setup effective guidelines, tools and controls.



NanoSafer - Outcome

- Background report
 - Background knowledge
 - Field study results
 - Good practice
- 6 sector brochures
- Web-based Control Band Tool
 - Risk Evaluation
 - Inspiration on safety controls
 - Attention points in production



NanoSafer – Risk Evaluation (Control Band)

http://81.236.184.200/Exposure.aspx?eid=13 - Windows Internet Explorer provided by Teknologisk Institut 2010

http://81.236.184.200/Exposure.aspx?eid=13

http://81.236.184.200/Exposure.aspx?eid=13

NANOSAFER Velkommen Henrik Vejen Kristensen! [Log Ud]

Start Materialer Processer Beregn Score Administration

PROCESSER

Du har registreret følgende processer

Proces
Mixing Rediger

[Registrere ny exponering](#)

Procesbeskrivelse
Mixing

Vælg procestype
 Pulverhåndtering
 Udslip

Energi-niveau
H3 (0.5) : moderat energi (f.eks. hælte med 5 - 30 cm faldhøjde, iblanding af pulver i flydende medium)

Mængde nanomateriale avendt per cyklus ved arbejdsstationen?
50 kg

Hvor lang tid tar en cyklus ved arbejdsstationen?
2 min

Tidsrum imellem hver arbejdscyklus?
60 min

Hvor mange gange gentages arbejdscyklus per dag?
8 gange

Angiv mængde per skefuld, sæk, big-bag der håndteres
50 kg

Angiv hvor lang tid det tager at hælde en ske-fuld, sæk, big-bag
2 min

start Google [Taskbar icons] 13:45



NanoSafer – Inspiration on Safety Control

The screenshot shows a Windows Internet Explorer browser window displaying a webpage titled "Kontrolhierakiet". The page content includes a control hierarchy diagram and a video player.

Kontrolhierakiet

Level	Control Measure	Icon
1	Elimination	✗
2	Substitution	☼
3	Teknisk foranstaltning	📁
4	Administrativ foranstaltning	📅
5	Personlige værnemidler	🧤

Below the hierarchy, three levels are listed in a separate column:

- Åndedrætsværn
- Handsker
- Beklædning

Personlige værnemidler - Åndedrætsværn

The video player shows a close-up of a white respirator mask with a red strap. The text "En god pasform er vigtig" (A good fit is important) is overlaid on the video.



NanoSafer – Attention points in production

E-læring - NanoSafer - APVgennemgang - Windows Internet Explorer provided by Teknologisk Institut 2010

Z:\NanoTool\Produktion\Flashmaster-nanosafes\arbejdspladsen\default.htm

E-læring - NanoSafer - Kontr... E-læring - NanoSafer - AP...

Arbejdspladsen

Produktion - Pulverhåndtering

Pulverhåndtering

Støvdannelse
Væsker i produktionen
Inspiration til indretning af produktion

Produktion

Varemottagelse

Laboratorium

Lager

Affaldshåndtering

Transport

Rengøring

Ventilation

Driftstop og vedligehold

Pulverhåndtering i procesanlæg:

start Google Indbakke Microsoft P... arbejdsplad... E-læring - N... DA 13:40



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