



Appendix II

Descriptions of risk mitigation
measures for seed treatment

Since the Accident 2008 with CNL treated corn seeds a lot has happened

Bayer secure quality of seed treatment with

// Professionalism the product application: Bayer supports customers in enhancing

- // Treatment equipment
- // Training on best management practice in treating seeds
- // Training on how to get certified (ESTA certification Europe; SeedGuard certification) // The certification covers the whole seed treatment process
- // Training on how to handle treated seeds (farmers)

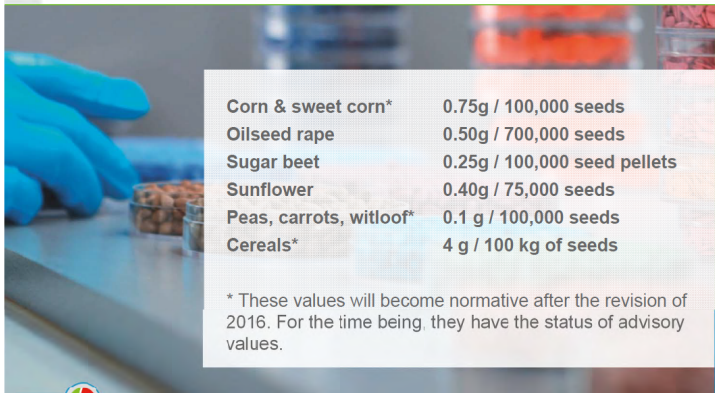

// Implementation of Product Stewardship quality standards for a high level of application quality at seed-treatment plants

- // Recommendation on recipes, best management practices. and tested modifications for sowing machines (e.g. deflectors), as required by authorities (for implementation by seed treaters and farmers) with close follow-up and on-going monitoring of treatment quality and implementation of best management practices in the field

// Bayer ensure that the solutions (formulations and recipes) delivered to the customer reduce potential dust emissions to a minimum by using film coatings, polymers, surfactant or oils incorporated into formulations, into coatings and additional surfactant system for treatment slurry

- // Monitor of Dust after treatment via Heubach values

Certification:
Industry Dust Reference Values EU



Corn & sweet corn*	0.75g / 100,000 seeds
Oilseed rape	0.50g / 700,000 seeds
Sugar beet	0.25g / 100,000 seed pellets
Sunflower	0.40g / 75,000 seeds
Peas, carrots, witloof*	0.1 g / 100,000 seeds
Cereals*	4 g / 100 kg of seeds

* These values will become normative after the revision of 2016. For the time being, they have the status of advisory values.

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- // Pneumatic drill (with positive flow) and pneumatic vacuum planter equipment has to secure low dust emission by using deflector technic, which release the air stream into the soil or close to the soil surface.

- // Bayer developed a deflector upgrade kit to improve deflector technic on top and a Bayer Sweep Air technic (Cyclone-based dust separator)

- // Dust emission can be reduced up to 1% only

Pneumatic Vacuum Sowing Machines: Deflectors



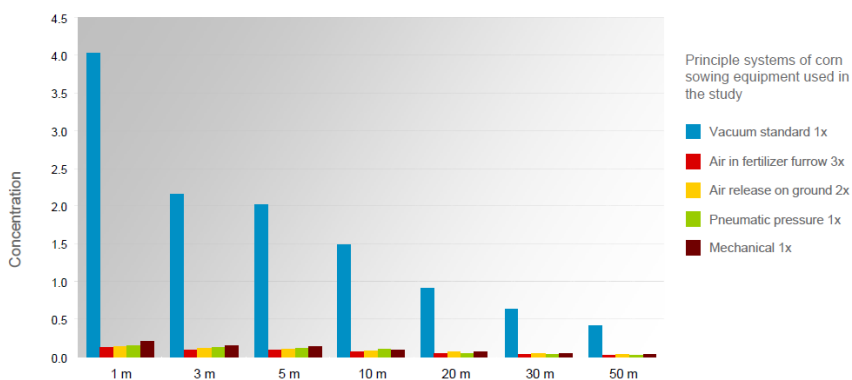
For vacuum pneumatic sowing machines a **deflector must be used to reduce emissions** of dust into the air and off-field deposits!

PNEUMATIC (VACUUM)



Use of a deflector is a **must!!**

Pneumatic Vacuum Sowing Machines: How Deflectors Reduce Dust



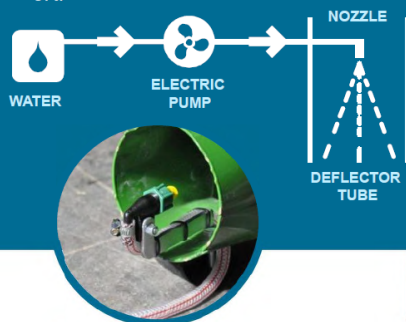
The results generated with moderate seed treatment quality show that all modifications offered by the different manufacturers substantially reduce exposure, and thus the risk to humans and the environment.



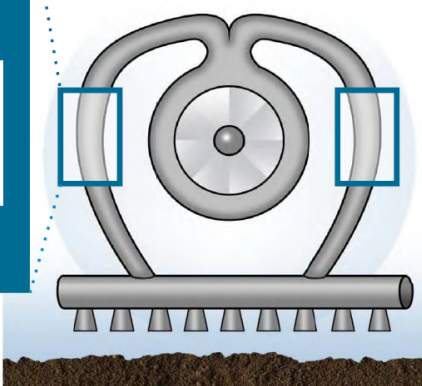
Bayer Solutions: Bayer AirWasher (Deflector Upgrade Kit)



- Exhaust air guided via a pipe where water is atomized by nozzles
- 97% reduction in dust drift confirmed by JKI



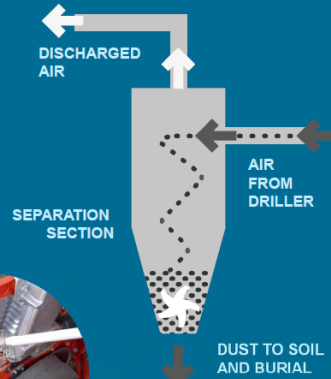
Installing the AirWasher is an easy way to further improve the efficacy of your deflector.



Bayer Solutions: Bayer SweepAir



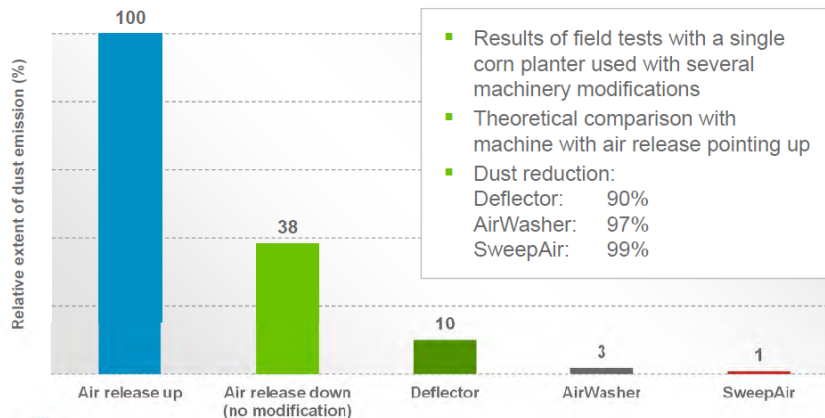
- Cyclone-based dust separator
- Disposal of dust into the furrow (burial in the ground)
- 99% dust drift reduction for prototype device confirmed by JKI
- To be implemented via equipment manufacturers



Bayer Solutions: Modification Efficacy



The dust mitigation options tested on a single corn planter drastically reduce dust emissions.



Implementation of „Deflectors“ in Europe Status

- Deflectors are mandatory in the following European countries: **D, F, B, NL, Lux, CH, AU, GR**
- Deflector introduced into good management practices of the “Little Red Tractor” farm quality assurance scheme in the UK, covering 90% of **UK** farmers.
- Implementation together with seed companies in **Italy** (Po valley) as part of the Sonido launch (2000 deflectors, supported by the 5PAP budget).
- Bayer campaign started in **Spain** to implement 1000 deflectors before the sowing campaign 2016 in the two main sowing regions, where the highest potential risk was identified (**Portugal** covered)
- In **Greece** deflectors were offered to the market through the cotton loyalty program (stopped). More than 250 deflectors distributed by BCS.



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Implementation of „Deflectors“ in Europe Status

- Bayer campaign started in **Turkey** to implement 2000 deflectors **before sowing campaign** 2016 in three main sowing regions (potential cooperation country with Syngenta).
- Discussions with STISSC ongoing to kick-off deflector program also in **Ukraine**
- Support given to John Deere to spread the use of fluency agent in Europe!



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Implementation of „Deflectors“ in Europe Status 5 Point Action Plan

5 Point Action Plan (5PAP): Implementation of deflectors together with Syngenta in Europe:

Hungary:

Awareness raised in the farming and stakeholder community (70 % penetration)

- 800 deflectors implemented before sowing season 2015
- 4000 deflectors to follow before sowing season 2016
- 1st of November 2015 deflectors will be **mandatory** in Hungary

Romania:

- 5PAP kicked off
- Deflectors implemented in loyalty programs from BCS/SYN
- Talks with authorities already ongoing to make deflectors mandatory

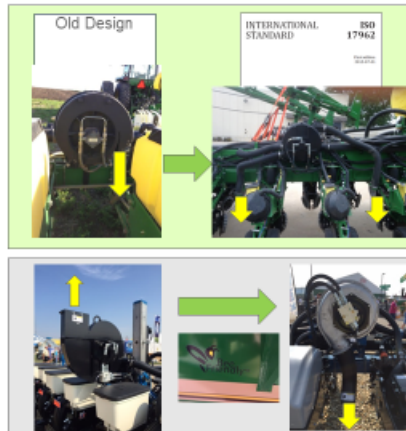


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Implementation of „Deflectors“ in the US ISO 17962

- Driven by US companies, ISO 17962 standard for pneumatic vacuum sowing machines was created.
- From January 1, 2016 onwards, US sowing machine manufactures will deliver only machines to the market, which comply with the ISO standard.
- First calculations by our Environmental Safety Institute show that ISO compliant sowing equipment is probably achieving about the same dust reduction values as machines equipped with a deflector.

Old sowing equipment versus sowing equipment inline with ISO 17962



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Implementation of „Deflectors“ in the US Fluency agent

- Fluency agent mandatory in Canada for sowing corn and soy with pneumatic vacuum sowing machines
- Implementation in the USA < 20 % at the moment
- To be increased by the colleagues in the US to 100 % in corn latest by 2020
- Market penetration in soy (very low a.i. values per ha) and cotton depending on market acceptance
- Retro-fit deflector kit available for Kinze in Canada
- No retro-fit kits available in the US
- John Deere sowing machines need no modification with complete fluency agent implementation
- Still a solution for existing Kinze and Case equipment needed!



Kinze



Case

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Implementation of „Deflectors“ in the LATAM Status

Brazil:

- Risk map of critical areas done
- Fluency agent trials in Brazil as graphite replacement successfully conducted
- Roll out of fluency agent still under discussion
- Deflector survey already conducted by Syngenta, to be shared with BASF and Bayer
- Report may trigger further actions (available by end of October)

Chile / Mexico

- Critical areas identified
- Results of survey expected by end of the year, which will trigger further actions

Venezuela

- No activities based on political and economic situation



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Implementation of „Deflectors“ in the APAC Status

New Zealand

- BCS NZ tested BFA for plantability in maize for two seasons, found satisfactory
- 2014 maize planting season Bayer Fluency Agent completely replaced talc with new seed lubricant (BFA supplied FOC)
- Equipment used in NZ is mainly coming from the US (> 80 %) with a 50 % market share of John Deere alone

Australia

- Fluency agent under evaluation

China

- Northern part of China has the potential to become a risky area, as new cooperatives buy new pneumatic vacuum equipment from US
- Open action: check exports to China concerning ISO conformity



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Summary and Outlook

- A survey to identify potential risky areas identified Europe, US, Canada, Brazil, Mexico, Chile and New Zealand as countries to focus our activities
- Implementation of deflectors or similar risk mitigation methods is underway for Europe, US, Canada and New Zealand
- ISO 17962 standard for dust release of sowing machines will drastically reduce the issue in future
- Implementation of Fluency agent will support us to mitigate partially the risk in Brazil
- Detailed risk analysis (use of machinery type) started in Brazil, Chile and Mexico
- Based on the **survey results**, further **activities will be implemented**
- **Continue discussions** with authorities and industry associations to establish new **planter dust reduction classes**
- **Support is needed** to get country buy-in and local/regional budget to
 - **mitigate the remaining risk** in US and Canada (existing Kinze / Case sowing machines)
 - **implement fluency agent** / deflectors in the other identified countries, especially **Brazil!!**

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