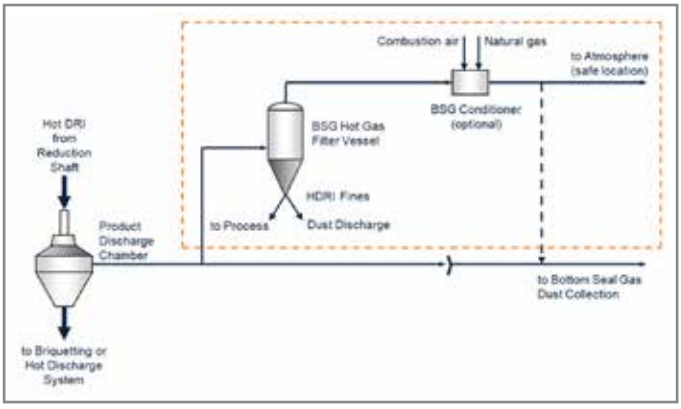
BSG HOT-GAS DRY-DEDUSTING SYSTEM
IMPROVING DIRECT REDUCTION PLANTS

Highly metalized DRI product fines, typically collected in a wet dedusting system, can be recovered using of a BSG (bottom seal gas) hot-gas dry-dedusting system.

Every Midrex hot discharge furnace, e.g. for production of HBI and/or HDRI, is equipped with a product discharge chamber (PDC). The seal gas from the reduction furnace lower seal leg exits the PDC and enters the BSG Dust Collection system, which is a wet gas cleaning system. This seal gas contains highly metallized DRI fines which are normally transfered into the process water/sludge system of the DR plant.

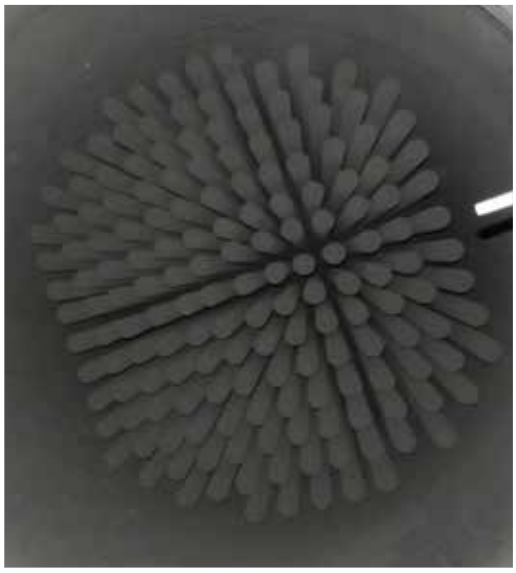
SOLUTION FOR RECOVERING DRI PRODUCT FINES

In order to utilize these highly metallized DRI product fines and increase DRI production, the seal gas exiting the PDC will be dedusted in dry condition and then utilized immediately, and as a result DRI/HBI production is increased. This technology package is called bottom seal gas hot-gas dry-dedusting system. The principle is shown in a simplified flow sheet (shown right).



Simplified flow sheet of the BSG hot-gas dry-dedusting system

Filter candles



Filtration elements installed (view from bottom)

Filter vessel

Given that the product discharge chamber is working under very low pressures and that the seal gas, including the DRI product fines, exiting the PDC has high temperature, special filtration components based on ceramic filter elements are used. Hot gas filter candles used in conjunction with the proprietary design by Primetals Technologies ensure a low differential pressure in combination with a very low clean gas dust concentration. Dedusting filter vessels are refractory lined inside.

The recovered HDRI fines can be routed back immediately to the process (e.g. to the hot product distributor) or discharged via a separate dust discharge system. For dust discharging at the filter vessels the DRI fines dust is distributed by a hot fines diverter to the process or the separate dust discharge system.

The separate dust discharge system consists of a DRI dust bin, a slide gate, a rotary feeder, and a pug mill for charging the dust in a given period onto a truck for removal.

OPTION: PDC VENT GAS CONDITIONER TO REDUCE CO-EMISSIONS

The dry dedusted vent gas is treated downstream of the filter vessel to lower undesired gas components (mainly CO). By installing of a vent gas conditioner, consisting of a single gas burner, operated with natural gas and combustion air as well as auxiliary air, the CO content in the vent gas can be lowered to 200 ppmv.

MAIN ADVANTAGES

- Increased plant yield through recovery of highly metallized hot DRI fines
- Clean gas concentration < 5mg/Nm^3
- Up to 750°C operating temperature
- Reduced CO emissions, in case an off gas conditioner is installed
- Increased plant safety due to conversion of CO to CO_2
- No process water required
- No slurry handling needed
- Reduced maintenance
- No additional steel structure and foundations required (additional stiffening of existing plants may be required)

This system is already being used successfully in smelting reduction plants.

Primetals Technologies Austria GmbH
A joint venture of Mitsubishi Heavy Industries and partners

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