Intensiv-Filter GmbH & Co. KG

7TH ARAB INTERNATIONAL
CONFERENCE & EXHIBITION
ON ENVIROMENTAL PROTECTION in CEMENT

10 - 12 NOVEMBER 2009 - BEIRUT, LIBANON

Conversion of electrostatic precipitators into bag filters

presented by Ralf Esser & Dr. Ahmed Yehia

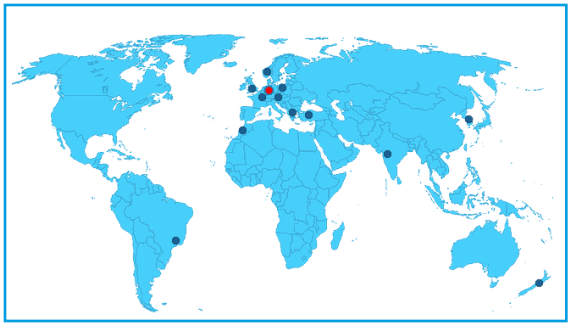
7TH ARAB-INTERNATIONAL CEMENT CONFERENCE AND EXHIBITION 2009 in BEIRUT

Agenda

1. Company Profile of Intensiv-Filter GmbH & Co. KG
2. Advantages of Intensiv-Filter bag filters (versus Electrostatic Precipitators)
3. Benefits for ESP conversions & retrofits made by Intensiv-Filter
4. Different concepts of ESP conversions executed by Intensiv-Filter
5. Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant
6. Conclusion
7. Contact @ Intensiv-Filter

Company Profile of Intensiv-Filter GmbH & Co. KG

Intensiv-Filter Group	**www.intensiv-filter.com**
Intensiv-Filter GmbH & Co. KG	Velbert-Langenberg, Germany
Intensiv-Filter Austria GmbH	Grieskirchen, Austria
Filtres Intensiv S.a.r.l.	Bouzonville, France
Intensiv-Filter (UK) Ltd.	West Midlands, Great Britain
Intensiv-Filter do Brasil Ltda.	Sao Paulo, Brasil
Intensiv-Filter Korea Ltd.	Seoul, Korea
Intensiv-Filter India Pvt. Ltd.	Pune, India



Infastaub Bad Homburg, Germany	Series-produced small filters < 30.000 m³/h
Solidux Billerbeck, Germany	Solutions for sound insulation

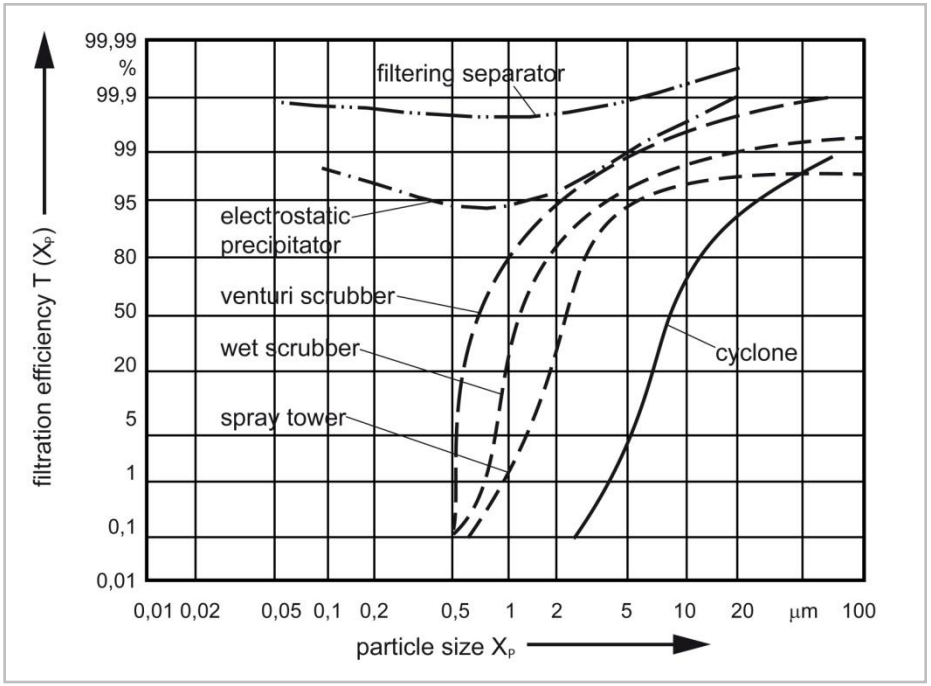
More than 400 employees world wide - Group Turn over appr. 70 million Euros

Reasons for ESP conversions & retrofits

- ✓ Stricter emission regulation by the authorities
- ✓ Use of secondary fuels
- ✓ Reduction of operation costs

Advantages of Intensiv-Filter bag filters versus ESP's

- ✓ Lower and constant clean gas dust emissions for the use of secondary fuels as kiln fuel to meet strict authority regulations
- ✓ Performance is independent on changing parameters and operating modes (e.g. compound & direct mode)
- ✓ Precipitation is not pending on moisture and chemistry of the gas & dust
- ✓ No CO – trips for kiln dedusting applications
- ✓ Online Maintenance possibilities and easy maintenance access (from the clean gas side)

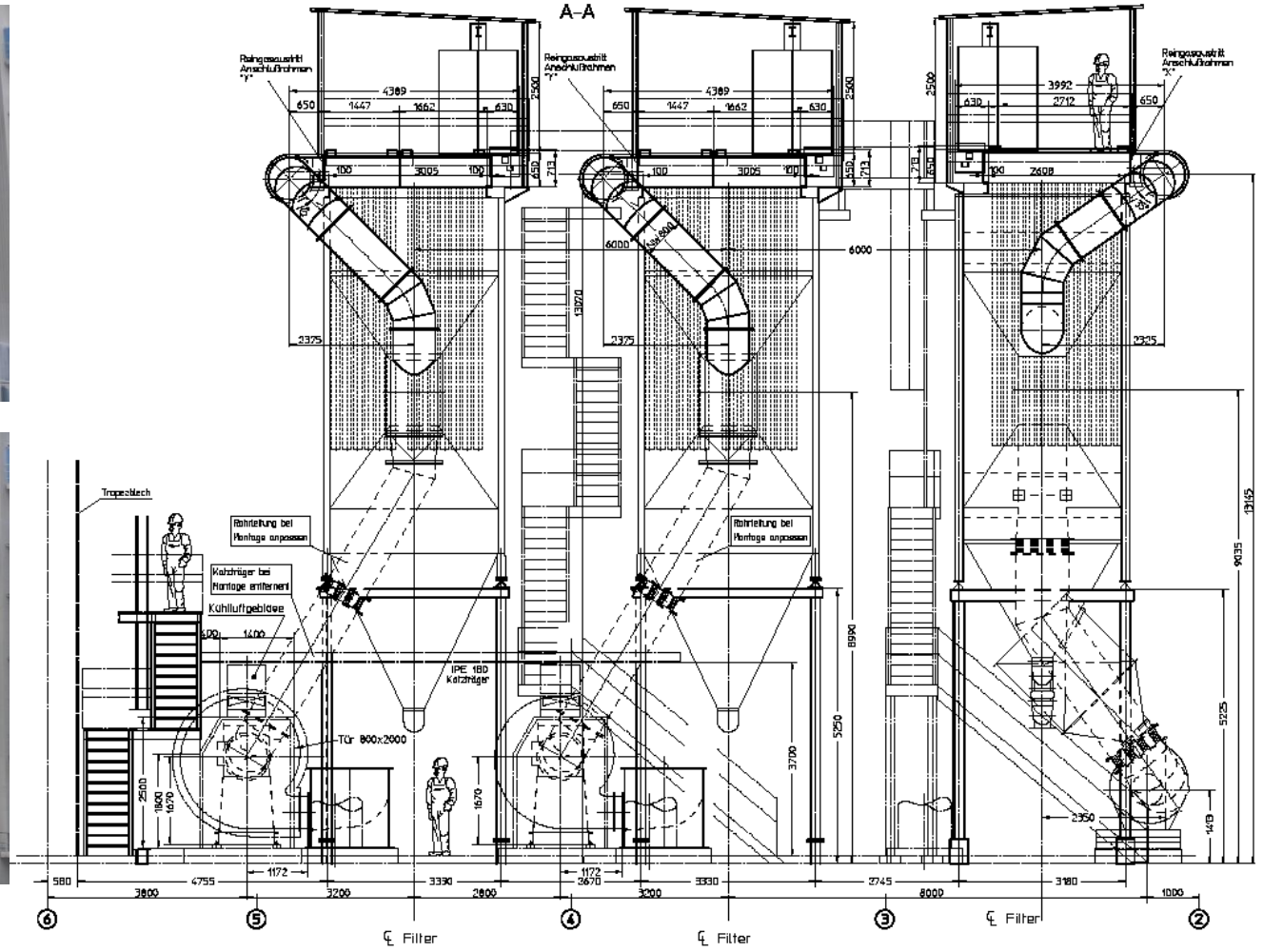


Benefits for ESP conversions & retrofits made by Intensiv-Filter

- ✓ Lower clean gas dust emissions (constantly) compared to the ESP operation
- ✓ Economical bag filter design using low pressure off-line cleaning in combination with bag length up to 8m can be foreseen for ESP conversions, to decrease the pressure drop across the bag filter and to increase the bag life time.
- ✓ Re-use of existing casing, duct work, steel support, dust transport and auxiliary equipment
- ✓ Flexible and pre-assembled filter head module design reduces down time to a minimum and enables the plant to execute ESP conversions during regular plant shutdown times
- ✓ Low cost solution (compared to a new installation)

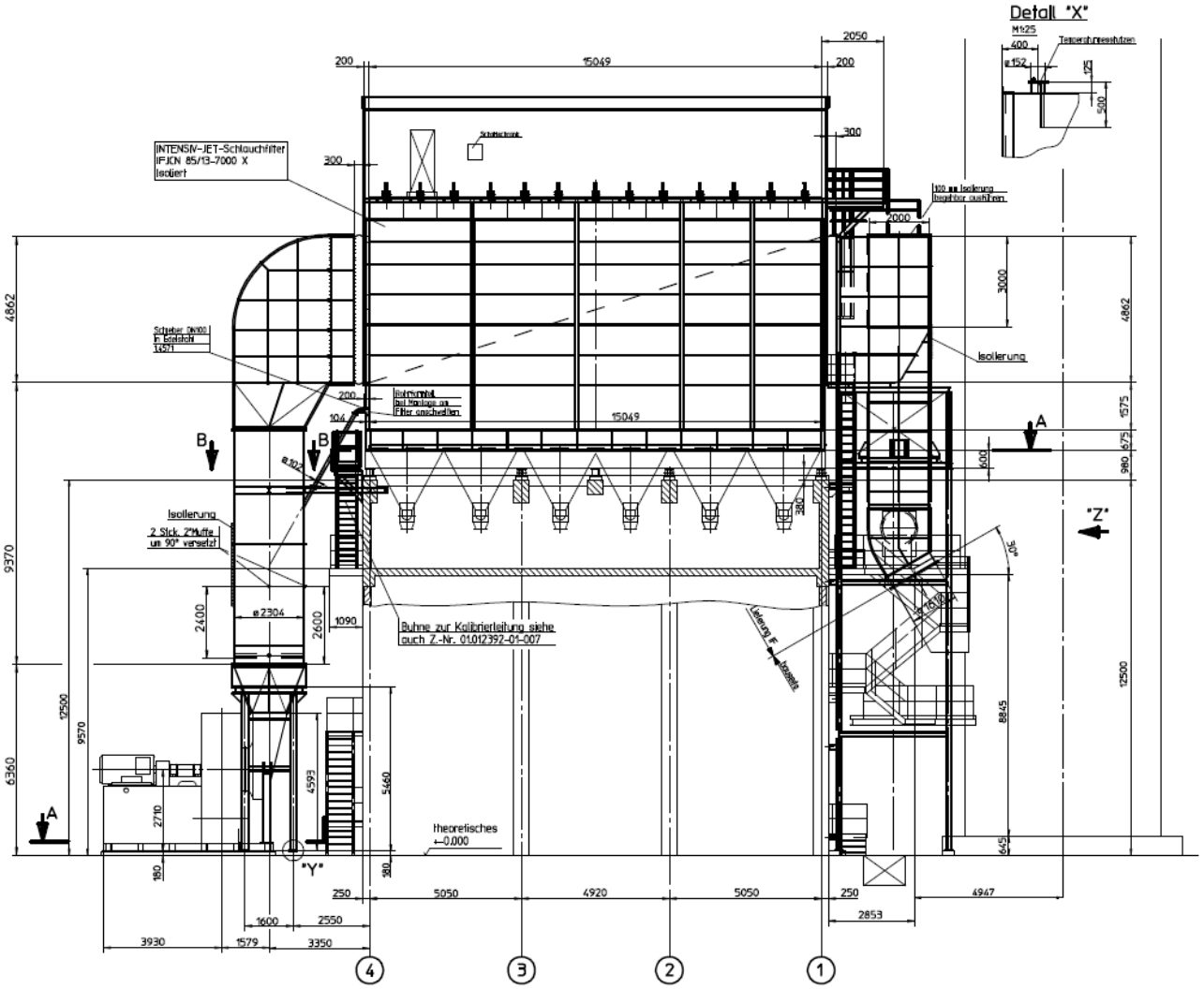
Different Concepts of ESP conversions executed by Intensiv-Filter

Pre-assembled filter head modules on top of ESP casing



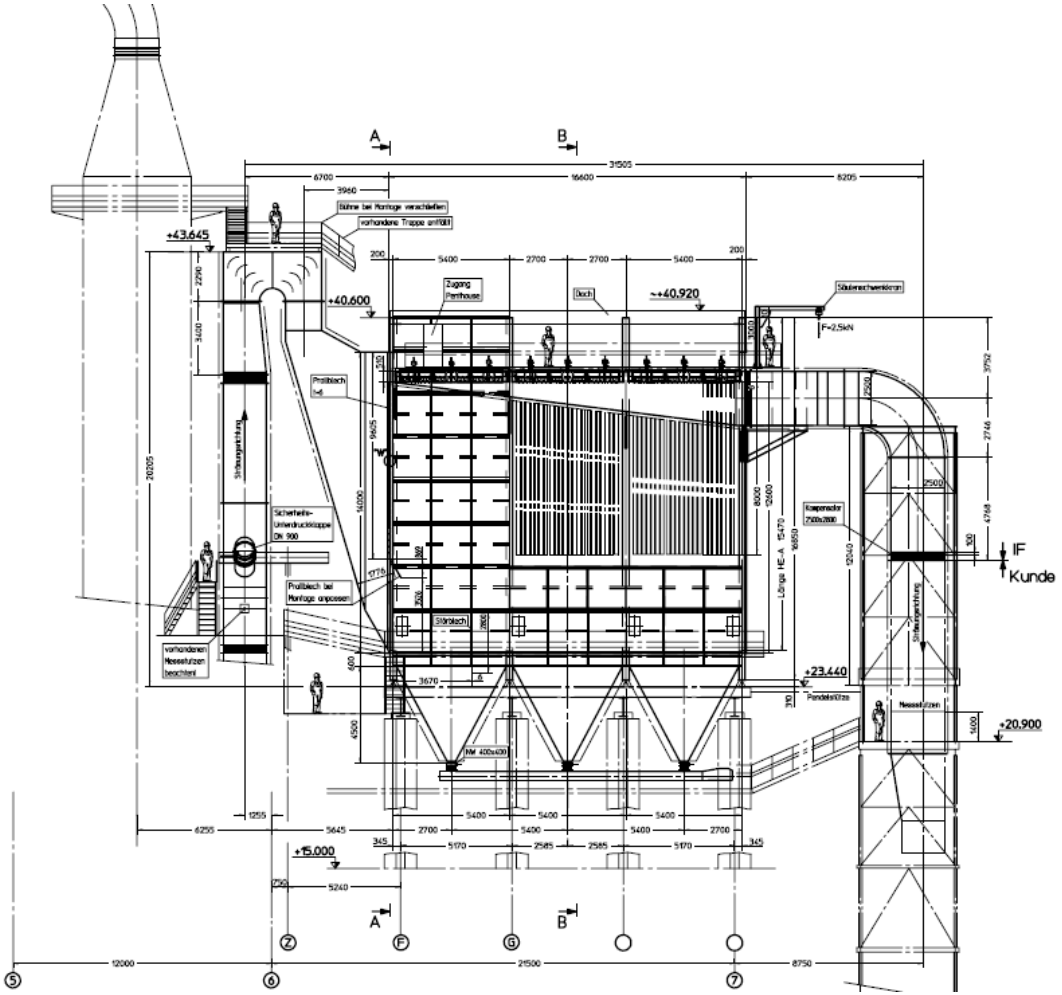
Different Concepts of ESP conversions executed by Intensiv-Filter

Pre-assembled casing on top of existing ESP hoppers



Different Concepts of ESP conversions executed by Intensiv-Filter

Pre-assembled filter head modules inside ESP casing, upper casing used as penthouse



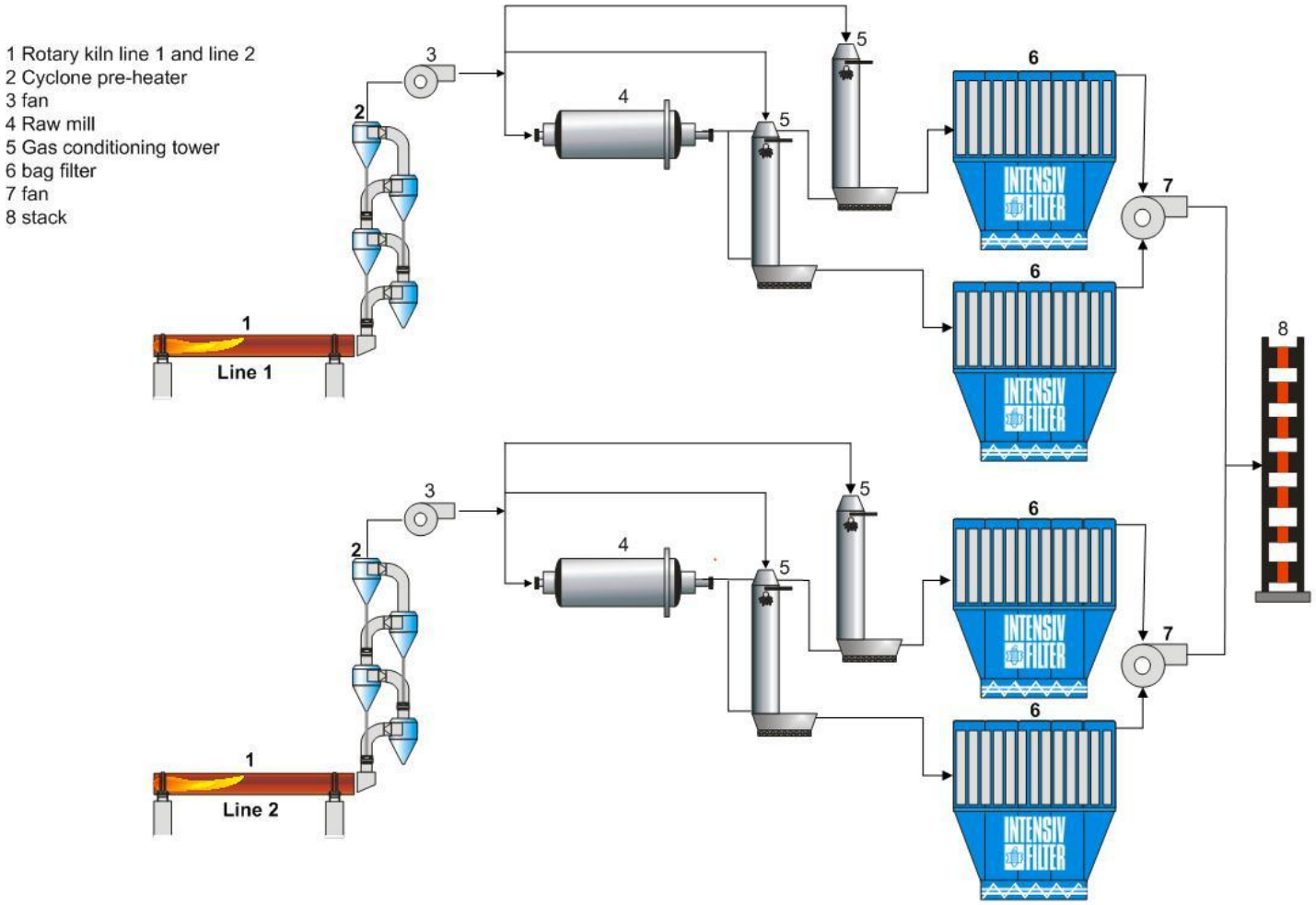
Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

Design Data

Process	**Kiln- / Raw Mill - bag-filter**	
Original ESP Supplier	**ELWO (Lurgi Type) / Poland**	
	Line 1 (2009)	**Line 2 (2005)**
Gas Volume Design	430.000 Am³/h	270.000 Am³/h
Gas Temperature Range	120°C	120°C
Intensiv-Filter Type	IF JCN 85/ 18 – 8000	IF JCN 85/ 18 – 6000
Installed Filtration Area	~ 6.400 m²	~ 4.800 m²
Filter Media	Polyacrylnitril	Polyacrylnitril

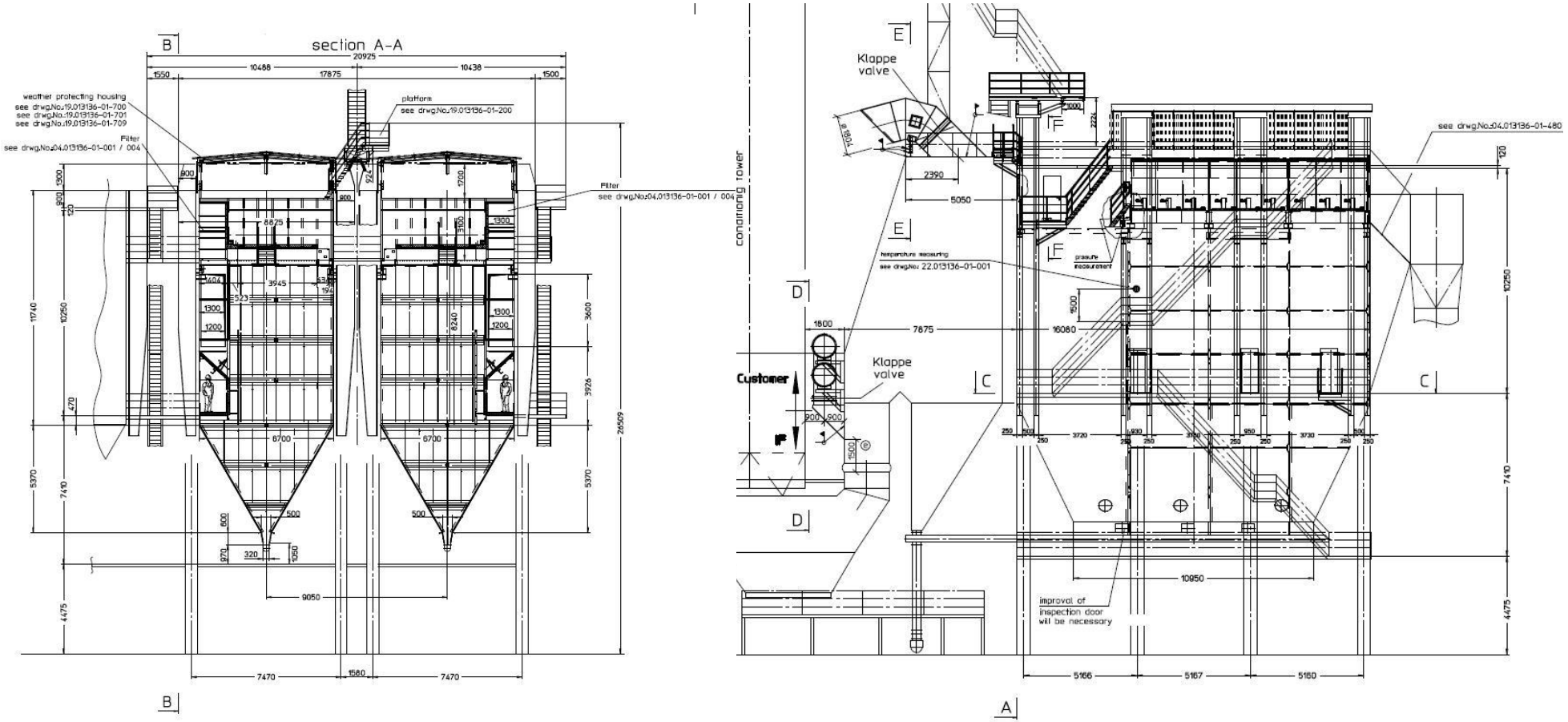
Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

Simplified flowsheet of Cementownia Nowiny



Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

Conversion Concept of Cementownia Nowiny



Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

before retrofit 2005

after retrofit of Line 2

Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

ESP top view before retrofit

retrofit of Line 1 in 2009

Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

New penthouse

Safety air damper

Inside new penthouse

Kiln bag filter conversion at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

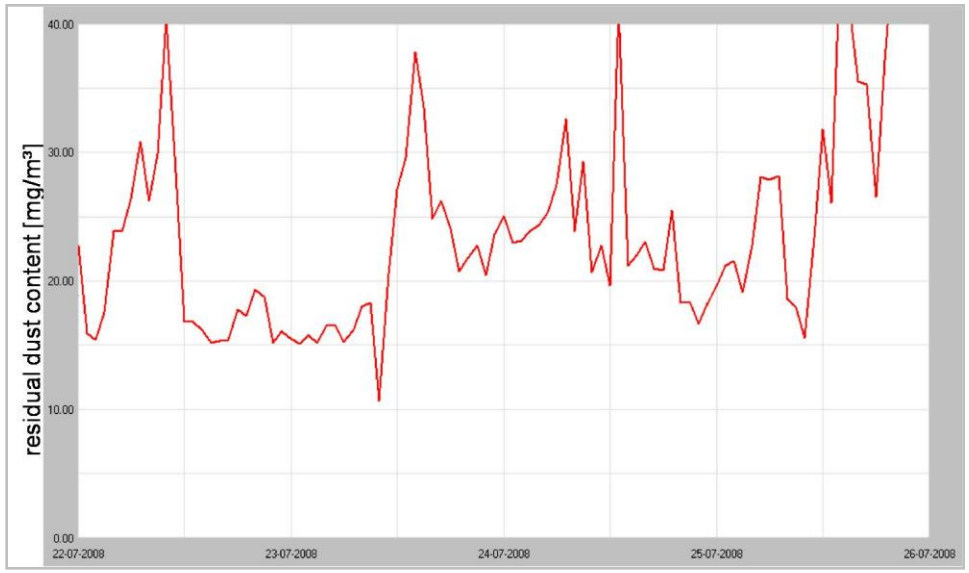
Line 1 after successful commissioning in 2009

Operation Data & Results at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

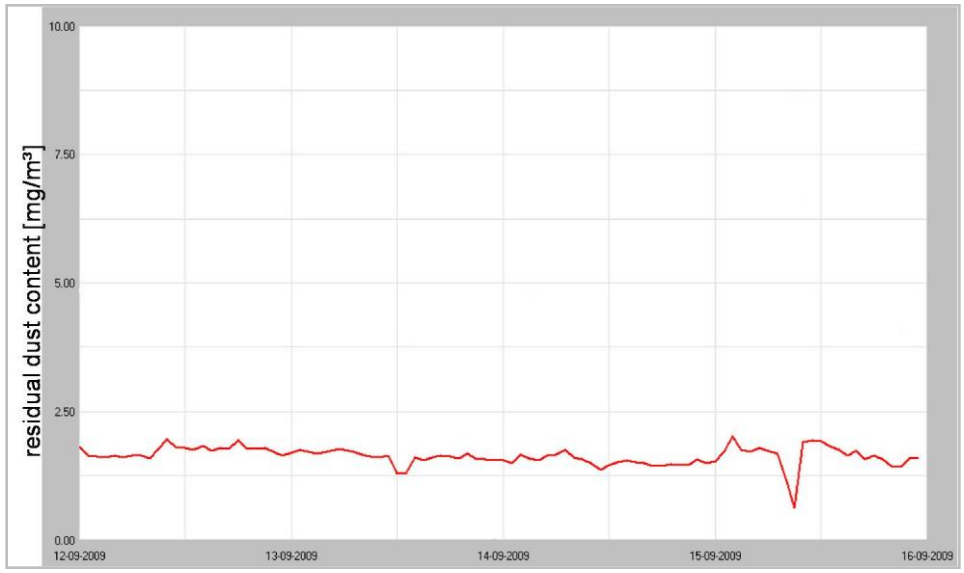
Operation Data	Line 1 (2009)
Intensiv-Filter Type	IF JCN 85/ 18 – 8000
Filter Media	8 m Polyester / Polyacrylnitril mix felt
Gas Volume Design	up to 430.000 Am^3/h with up to 40g/Am^3 dust load
Gas Temperature	up to 120°C
Clean gas load	less than 10 mg/Nm^3
Differential pressure	7 hPa
Cleaning Mode	Off-line
Cleaning pressure	appr. 3,0 bar
Compressed air consumption	72 Nm^3/h

Operation Data & Results at Dyckerhoff Zement's Cementownia Nowiny (Poland) plant

Operation Data Line (2009)



Residual dust content old ESP

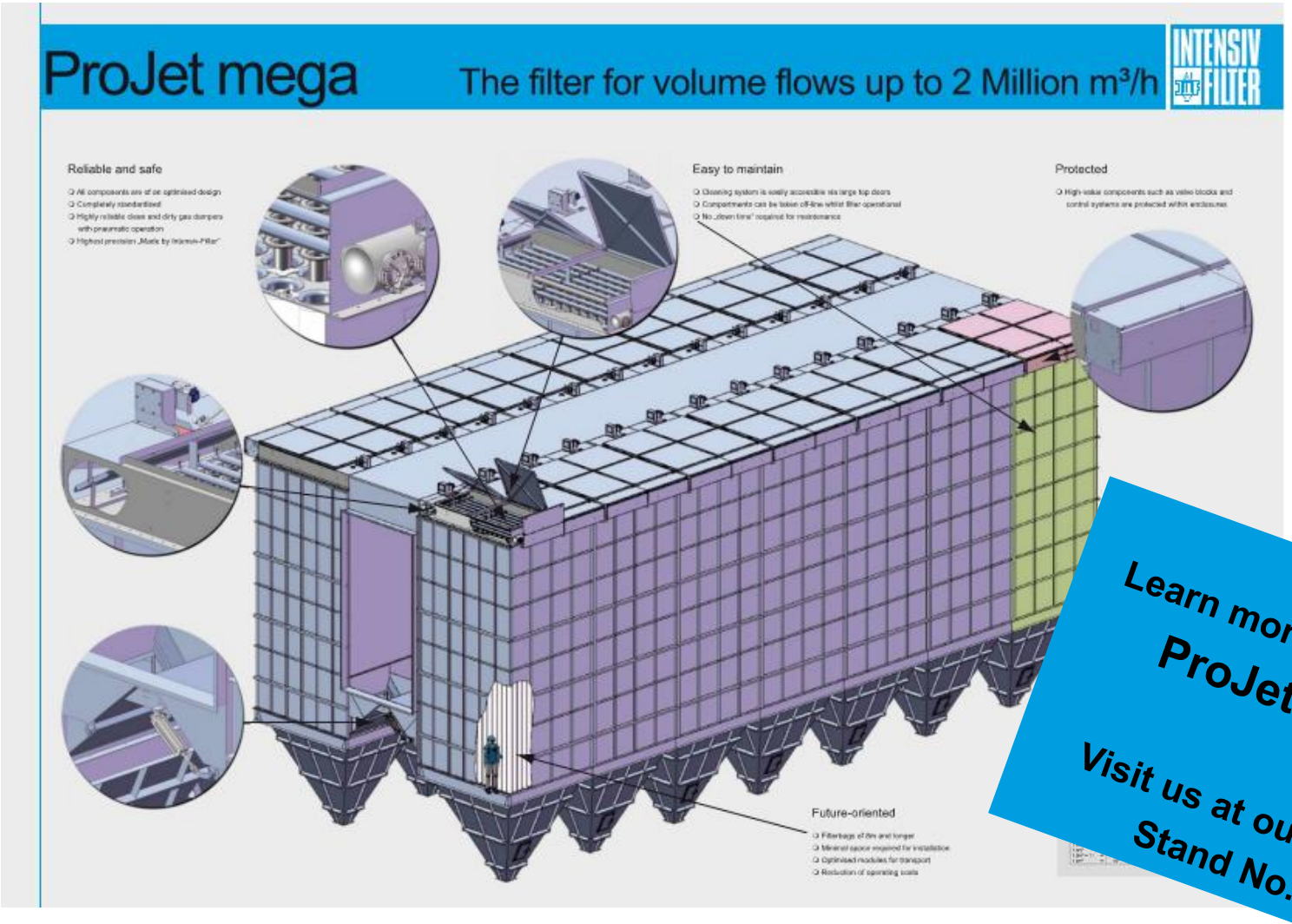


Residual dust content new Intensiv-Filter bag filter

Conclusion

- ✓ Low clean gas dust emissions (constant) independent from gas & dust properties
- ✓ Economical bag filter design can be foreseen for ESP conversions, to decrease the pressure drop across the bag filter and to increase the bag life time
- ✓ Re-use of existing equipment
- ✓ Reduced down time, enables the execution of the conversion during regular plant shutdown times
- ✓ Short amortisation time due to low invest cost solution

New Intensiv-Filter Bag Filter Generation – ProJet mega© Volumes up to 2 Mio. m³/h



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