



20 a 22 de Junho de 2016 - São
Paulo/SP

RAW MIX OPTIMIZATION WITH NEAR INFRA-RED ONLINE ANALYSIS IN CROSSBELT AND AIRSLIDE APPLICATIONS

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Realização



Associação
Brasileira de
Cimento Portland



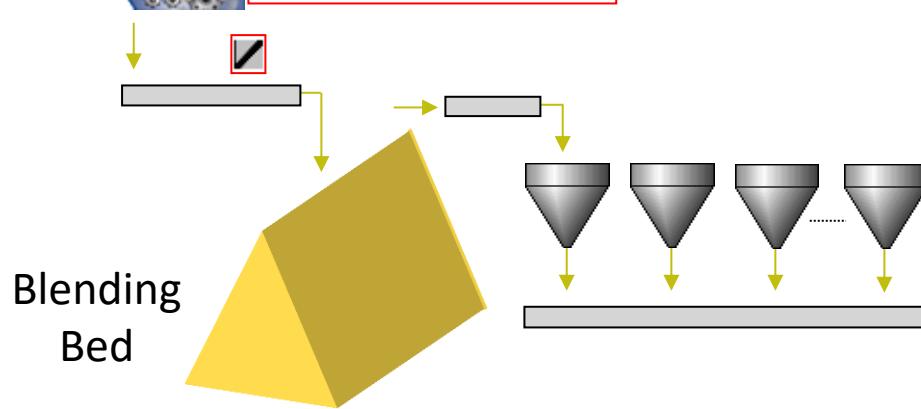
Objectives of an Online Analyzer installation

- **Process Improvement**
 - Real on-line system
 - Kiln feed quality after the raw mill
- **Use safe and proven system**
 - No radiation!
 - No import hassle or permit requirements
- **Return on Investment**
 - Very low cost of ownership
 - Reduce fuel consumption @ kiln
 - Reduce maintenance and service cost for the laboratory

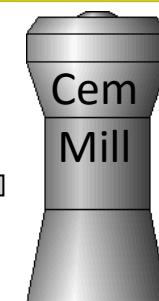
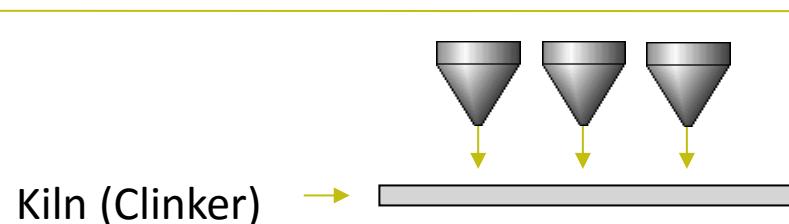
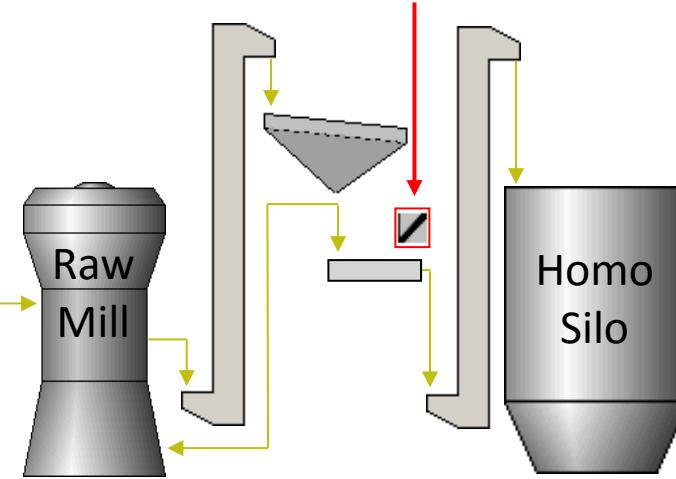
Position in Cement Production Process



SPECTRAFLOW
CROSSBELT



SPECTRAFLOW
AIR-SLIDE



SPECTRAFLOW
AIR-SLIDE

Cement

CrossBelt Application – Analyzer Example



Air-slide Application – Analyzer Example

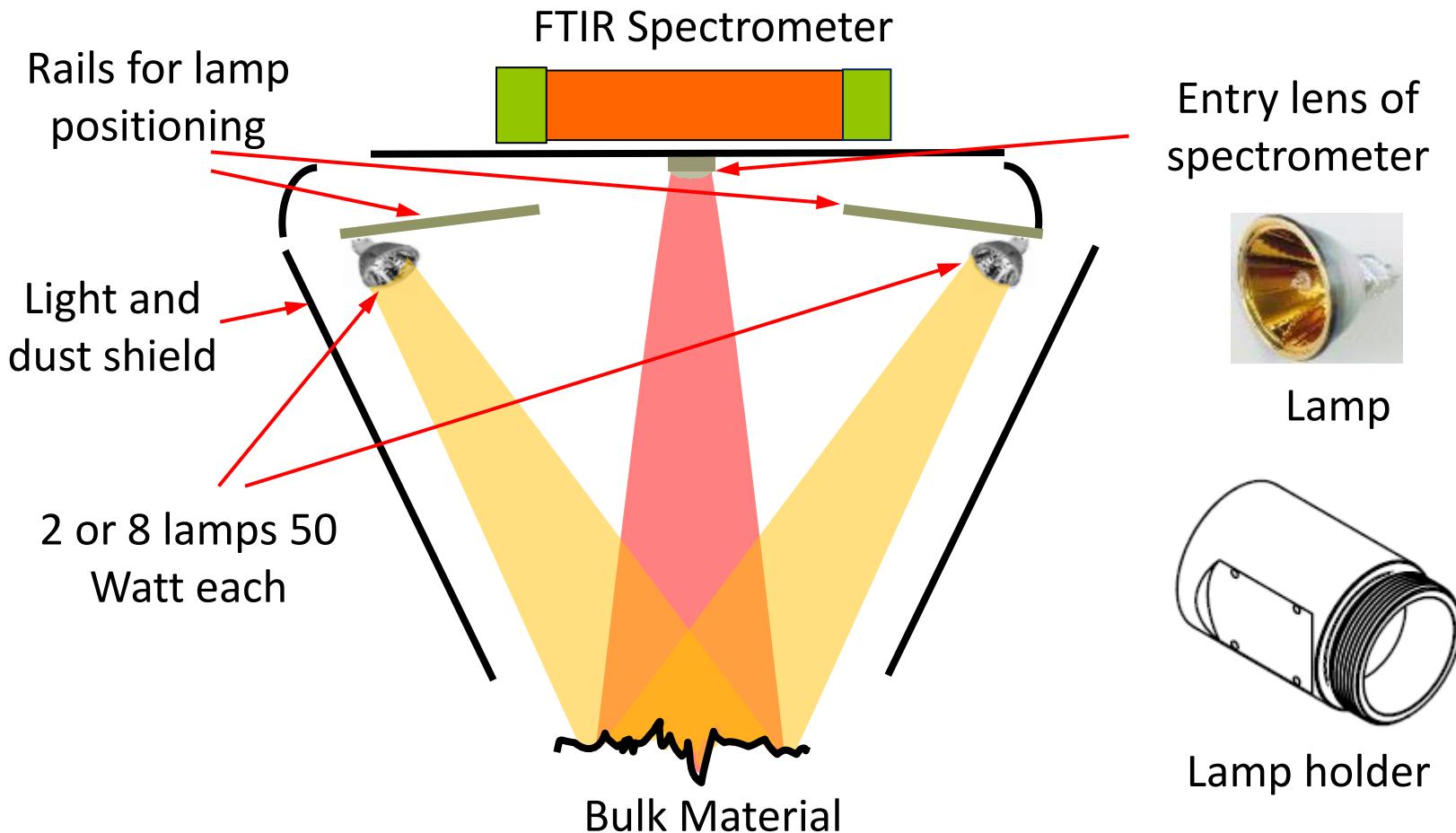




SpectraFlow On-Line Analyzer

A new development

NIR Analysis Technology





SpectraFlow On-Line Analyzer

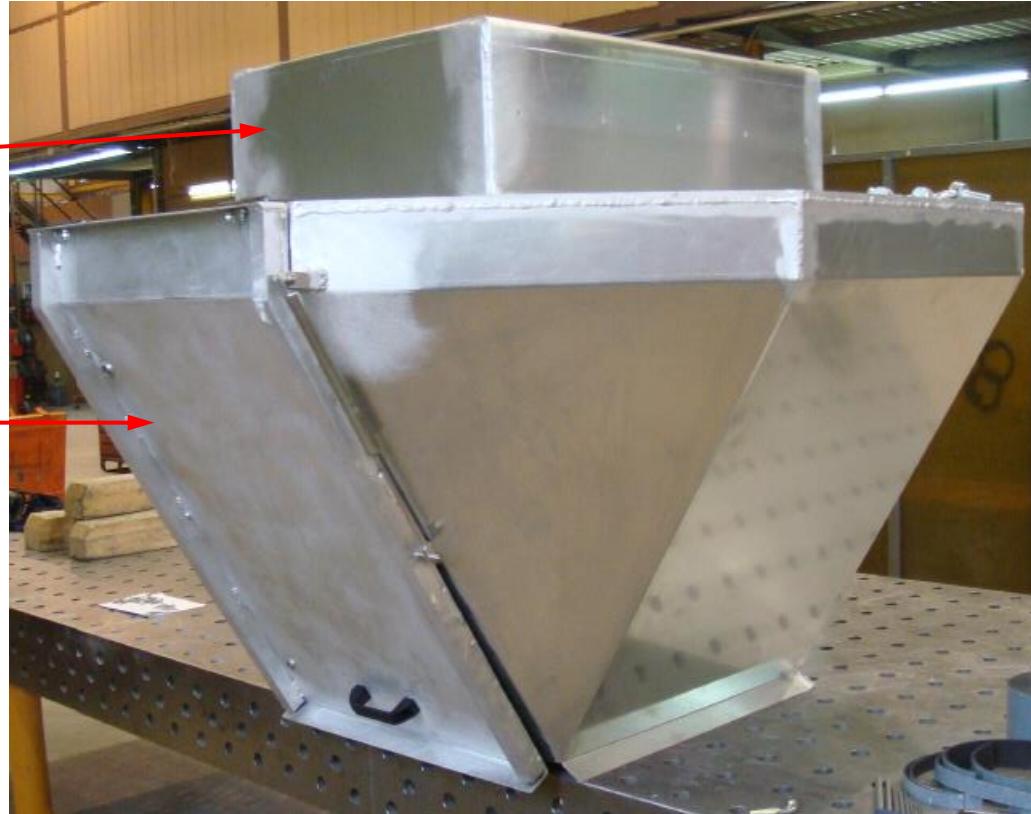
Crossbelt Application

Crossbelt Application – Analyzer Pictures

Overall View

Spectrometer
Compartment

Service Flap which
can be opened to
access the lights



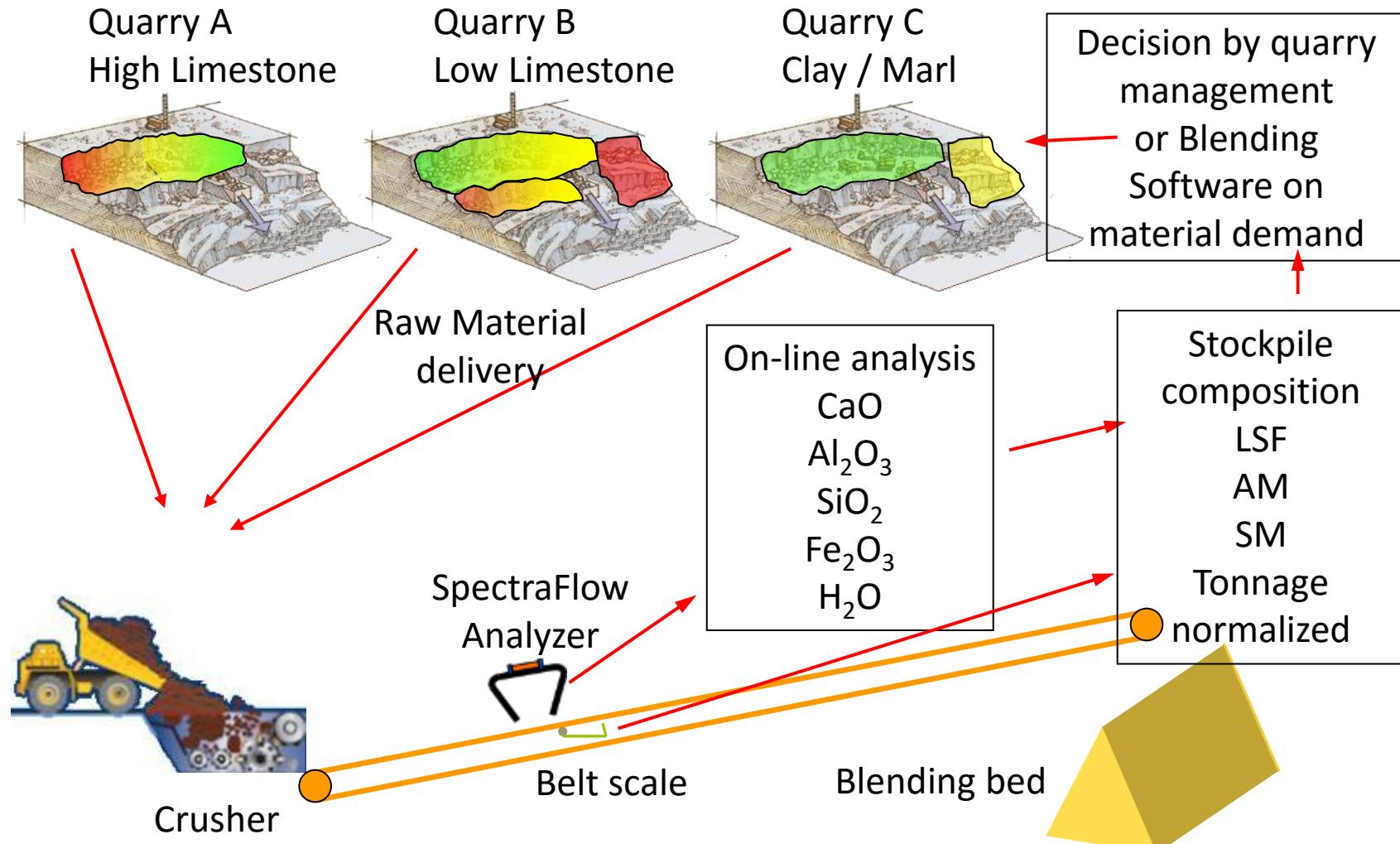
Crossbelt Application – Analyzer Pictures

Inside view
during operation

Spots as Infrared
Sources



Crossbelt Application – Quarry Optimization



Crossbelt Application – Stockpile SF vs PGNAA

Pile Number:		P1	...	P10	RMSD
CaO	XRF	50.81		51.395	CaO 0.4675 SF 1.2771 PGNAA
	SF	51.65		51.05	
	PGNAA	49.8		49.803	
SiO2	XRF	3.79		2.9213	SiO2 0.6321 SF 0.3132 PGNAA
	SF	2.797		3.6231	
	PGNAA	3.329		3.3292	
Al2O3	XRF	1.117		1.045	Al2O3 0.1294 SF 0.2433 PGNAA
	SF	0.913		1.051	
	PGNAA	0.69		0.69	
Fe2O3	XRF	1.439		1.1498	Fe2O3 0.0838 SF 0.1261 PGNAA
	SF	1.326		1.305	
	PGNAA	1.26		1.2595	
MgO	XRF	2.317		2.3133	MgO 0.2174 SF 0.5287 PGNAA
	SF	2.604		2.3348	
	PGNAA	2.77		2.7702	

Crossbelt Application – Benefits & Advantages

Benefits:

- Real-time control of your raw-materials
- Get stockpile close to module set-point
- Extend the life of your quarry

Advantages of SpectraFlow over conventional PGNAA analyzers:

- Independent of belt load variation
- No requirement for variable belt speed drives to compensate for belt load variations
- Actual 1-minute analysis values

Crossbelt Application – Benefits & Advantages

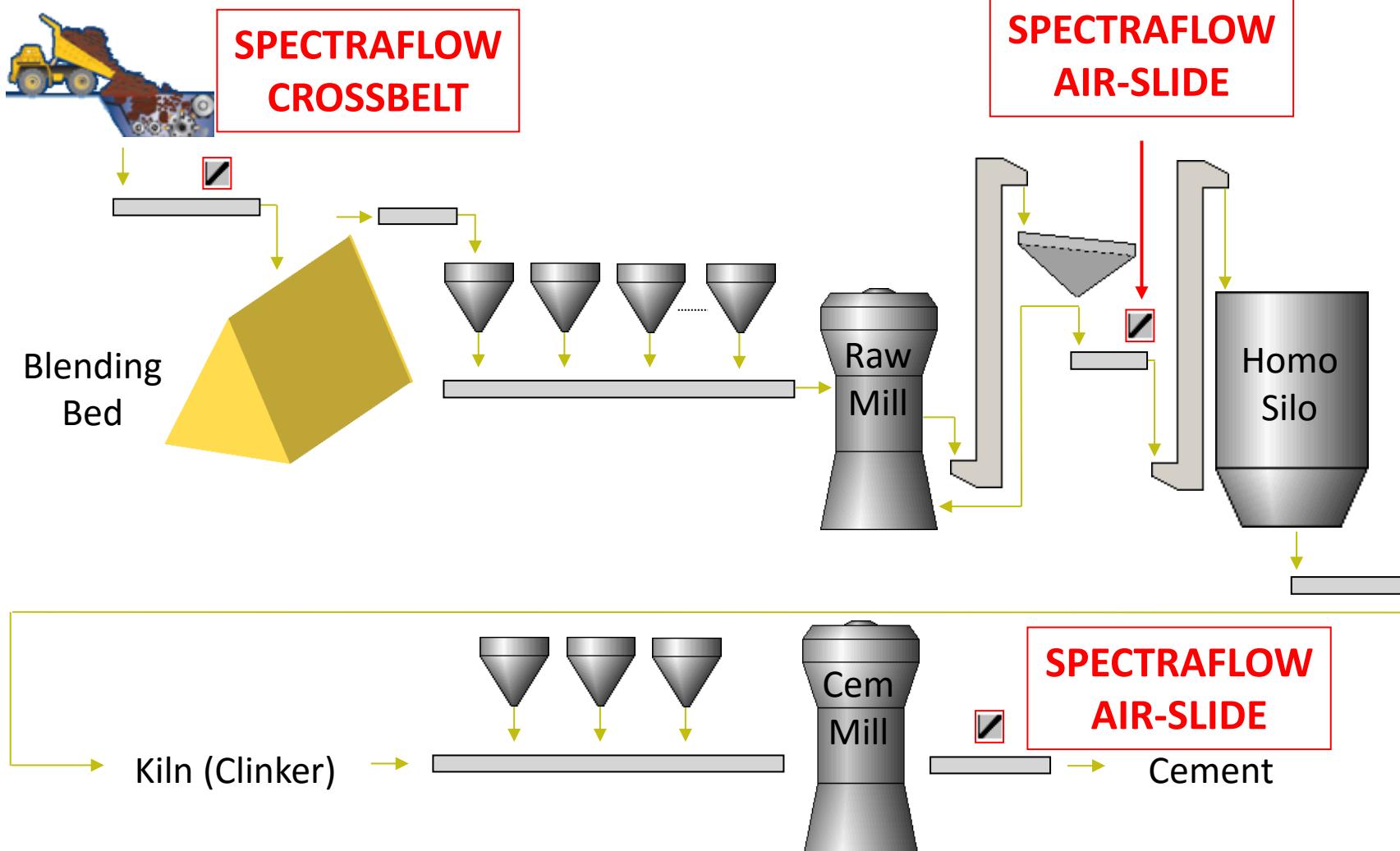
- Video – 45 seconds



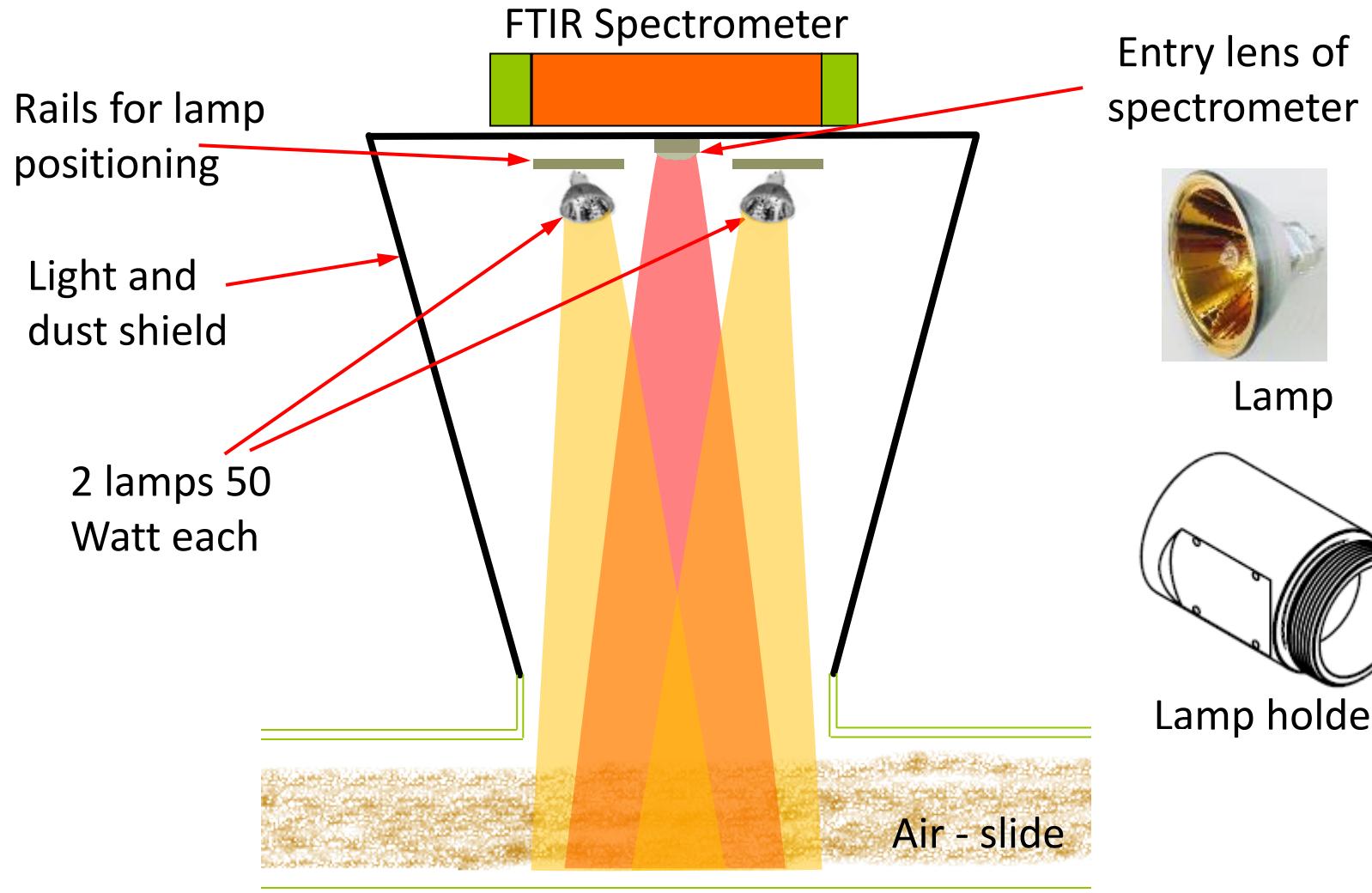
SpectraFlow On-Line Analyzer

Air-Slide Application

Position in Cement Production Process



Cross Sectional View

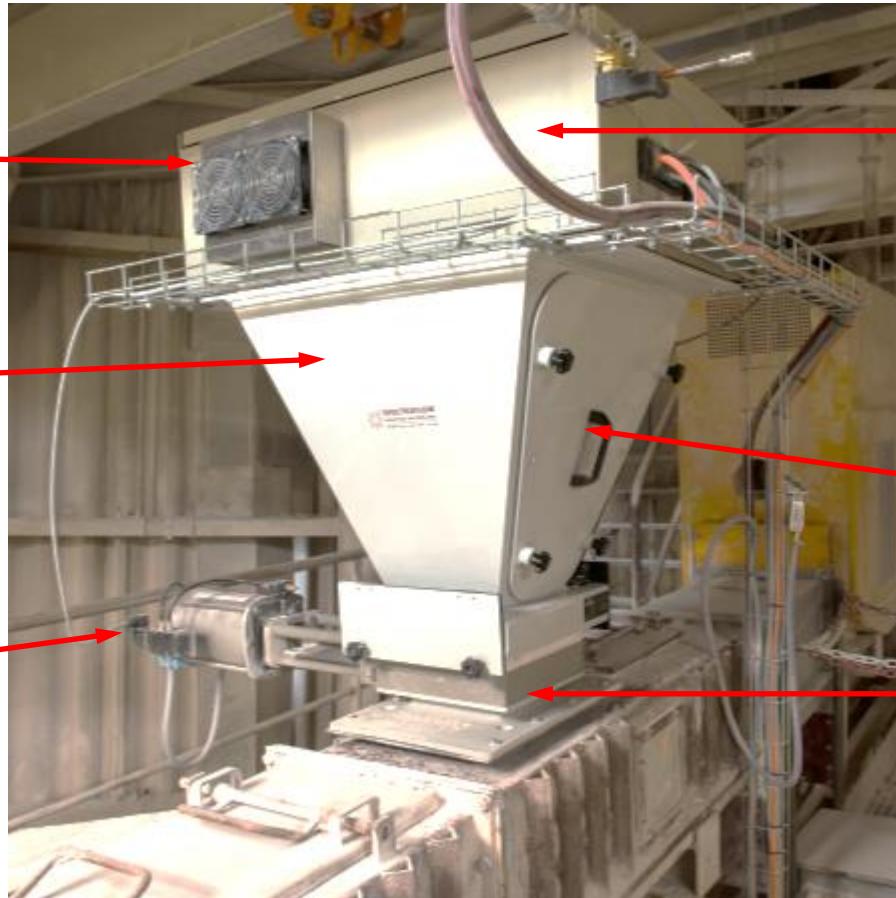


Analyzer Installation

Peltier
cooling
system

Illumination
unit and dust
protection
cover

Emergency
closing
device



Spectrometer
compartment

Inspection &
cleaning
opening

Tight air
seal

Analyzer Pictures

Overall View

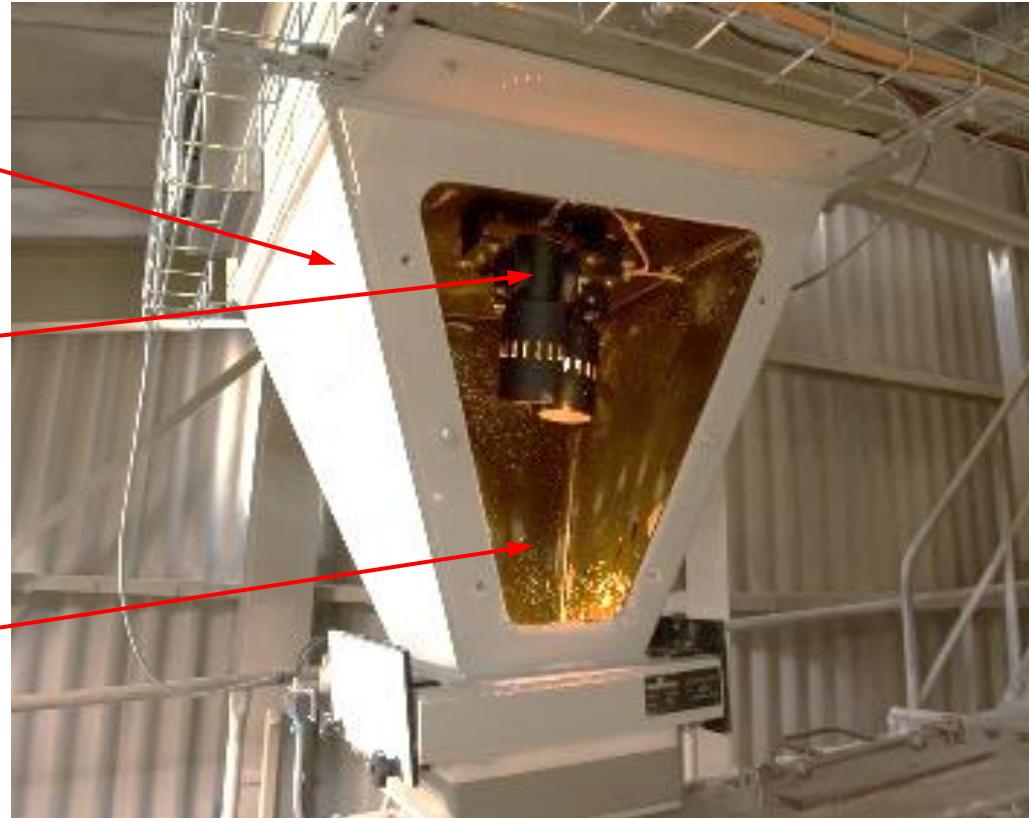
Light and dust shield



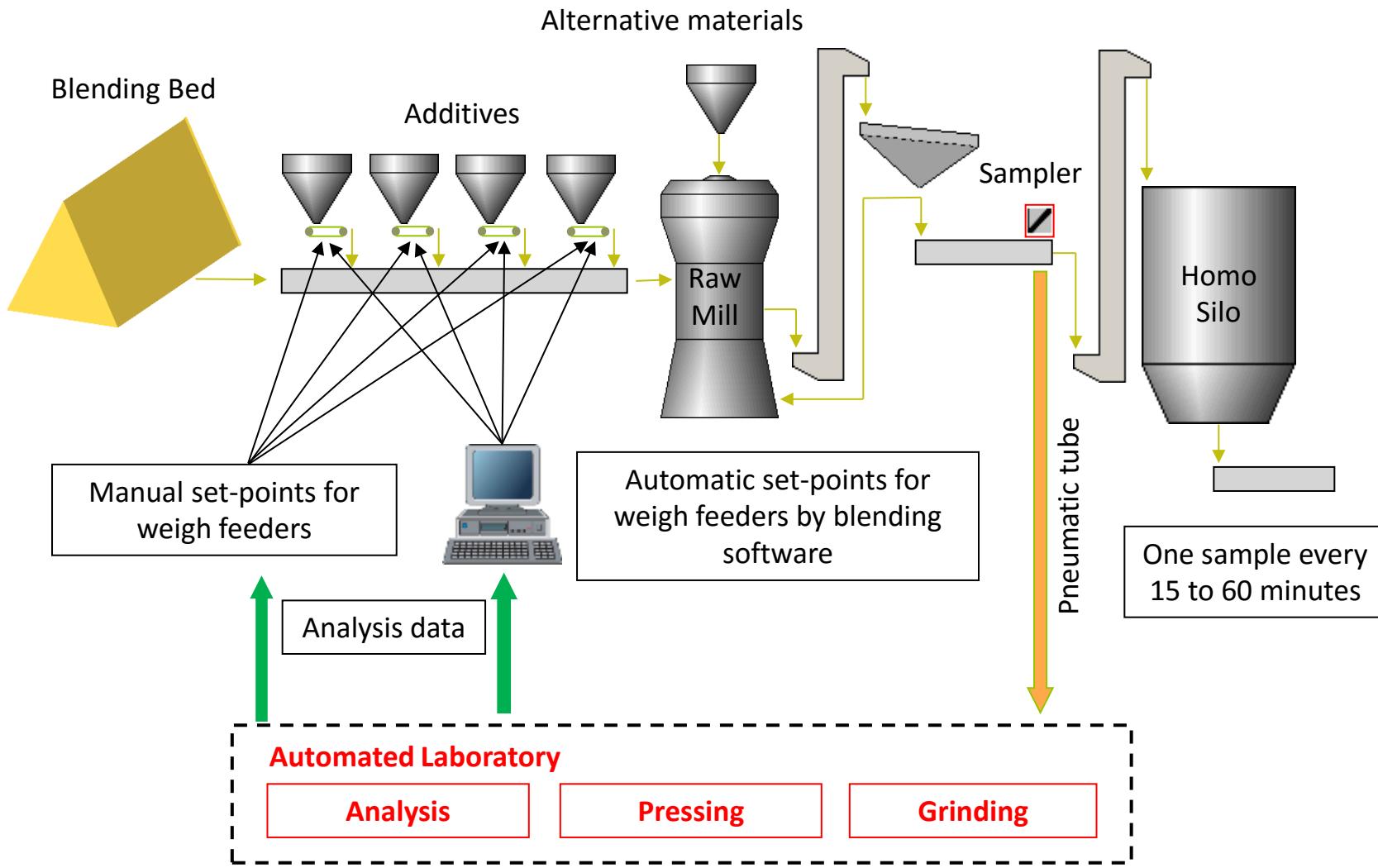
Lamp mounting



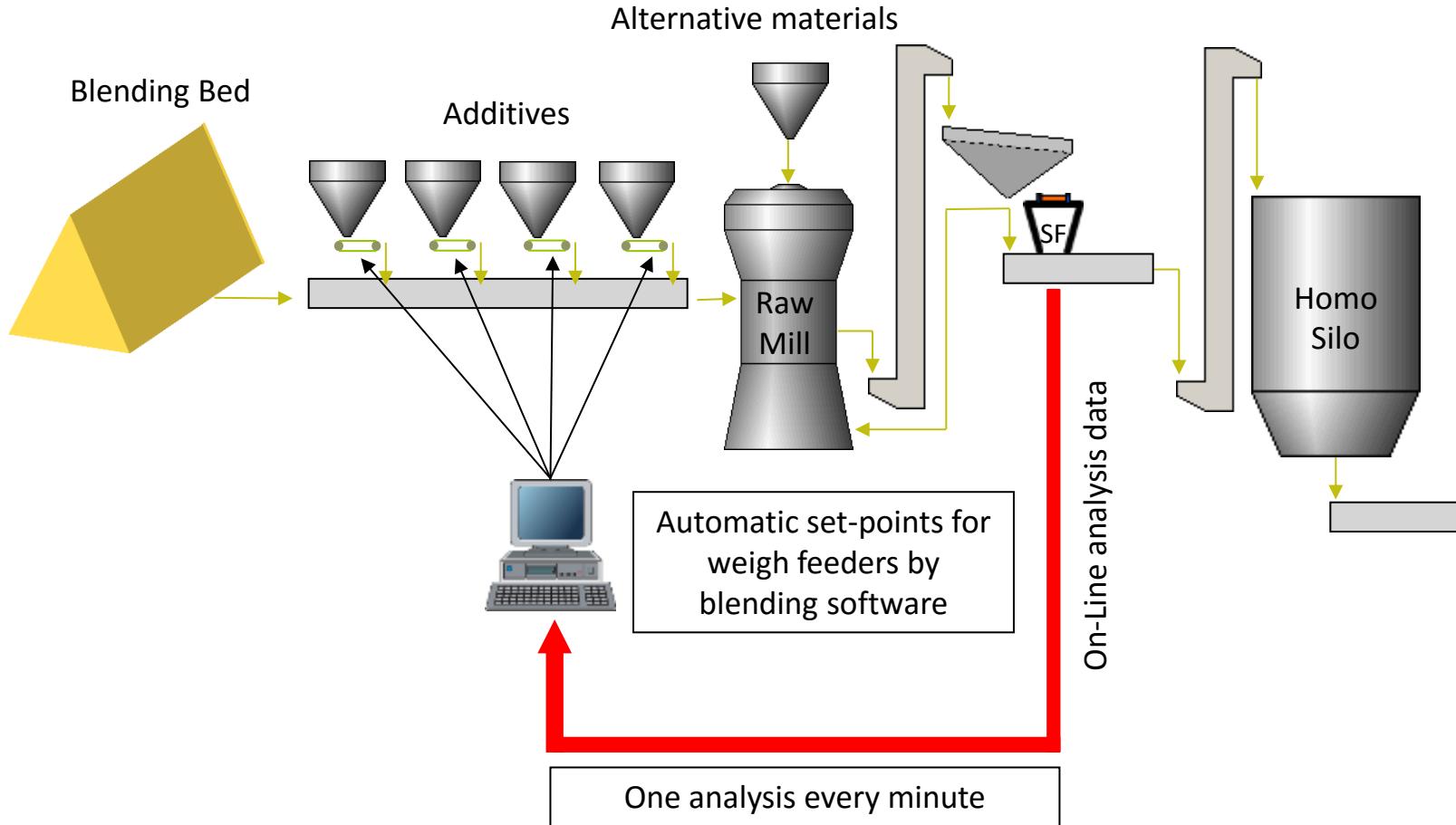
Service opening



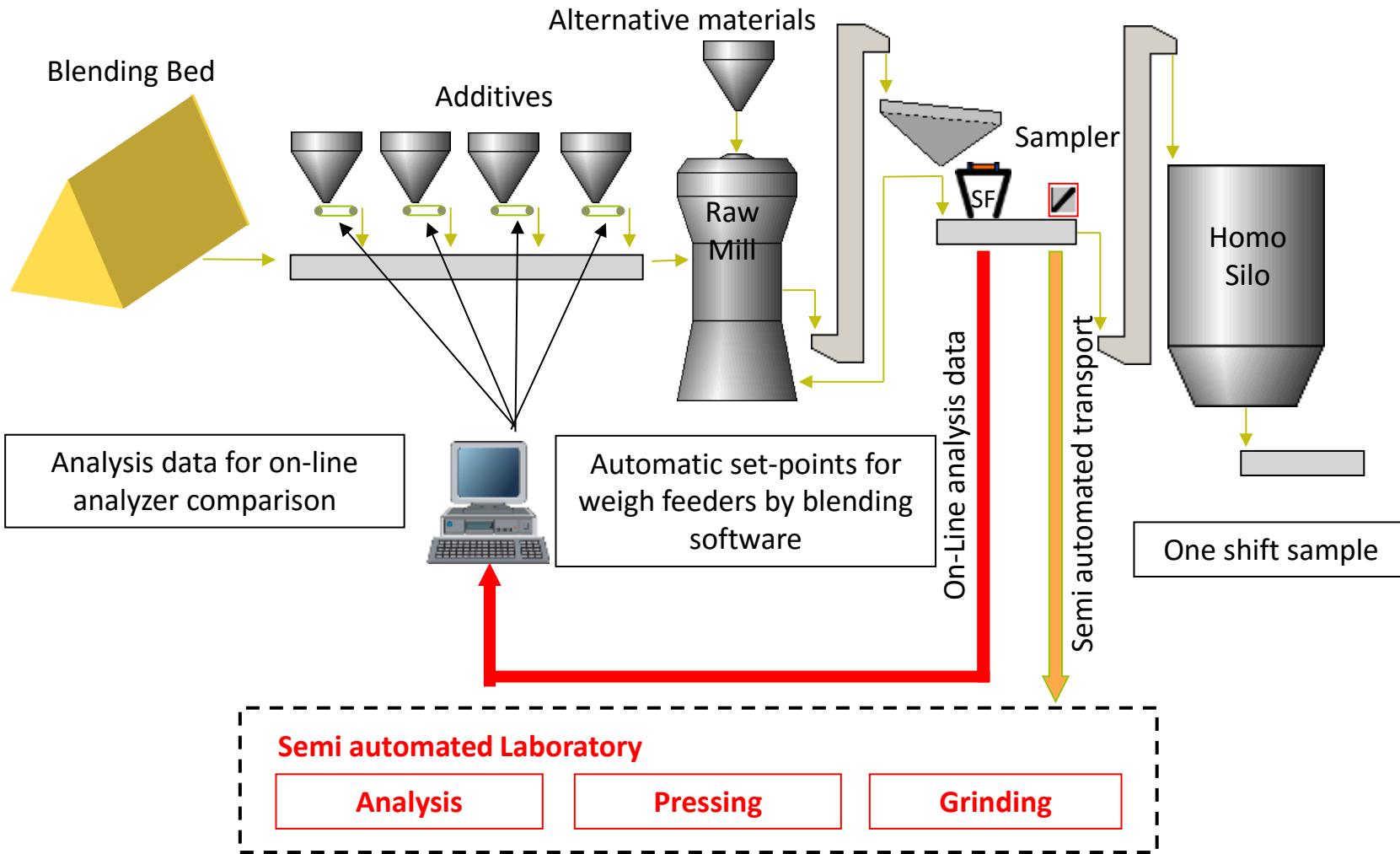
Raw-Mix Control – Slow Loop



Raw-Mix Control – Fast Loop



Raw-Mix Optimization



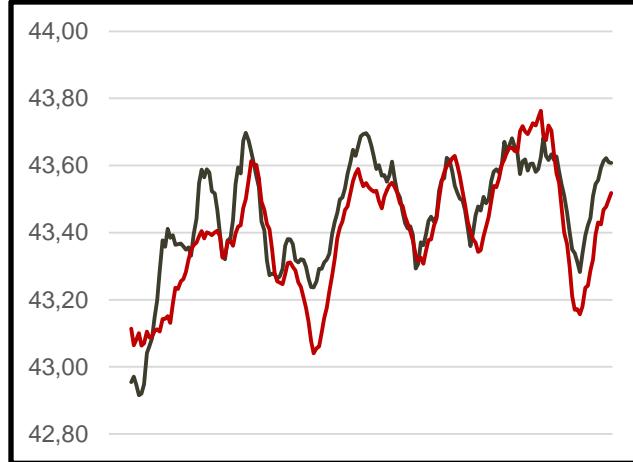


SpectraFlow On-Line Analyzer

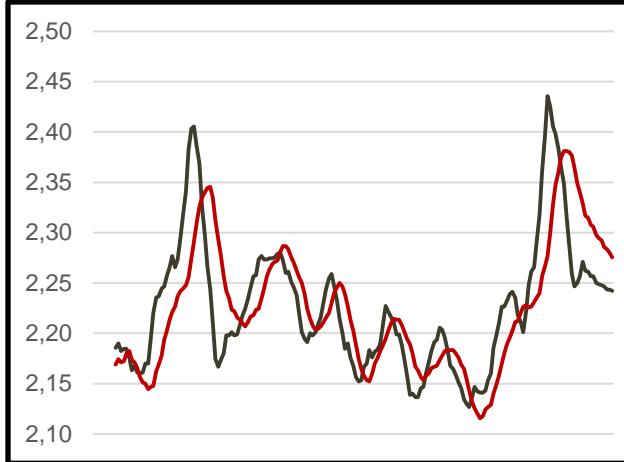
Measurement results

Dynamic comparison SF vs. XRF over a 10 day period

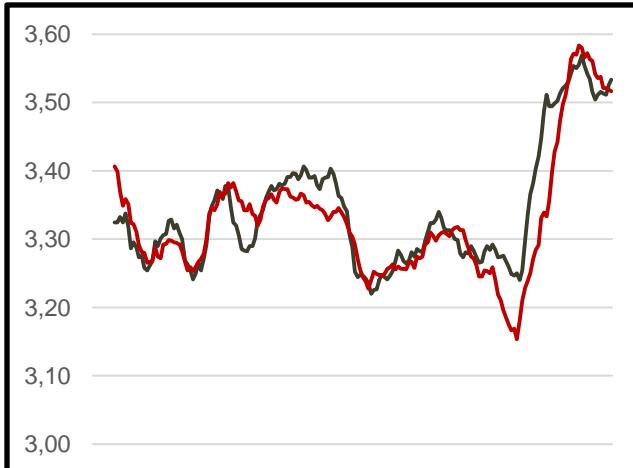
CaO



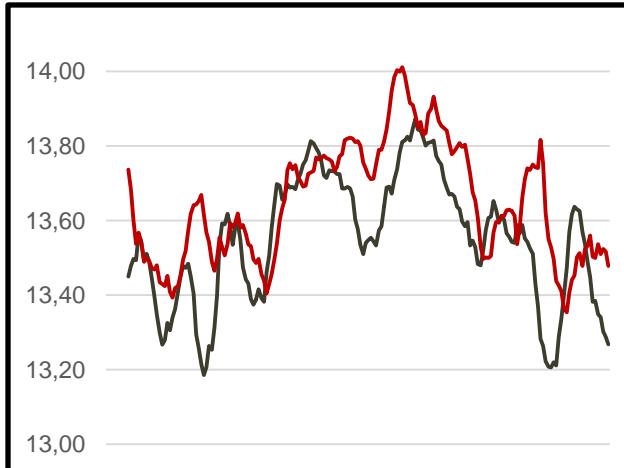
Fe_2O_3



Al_2O_3

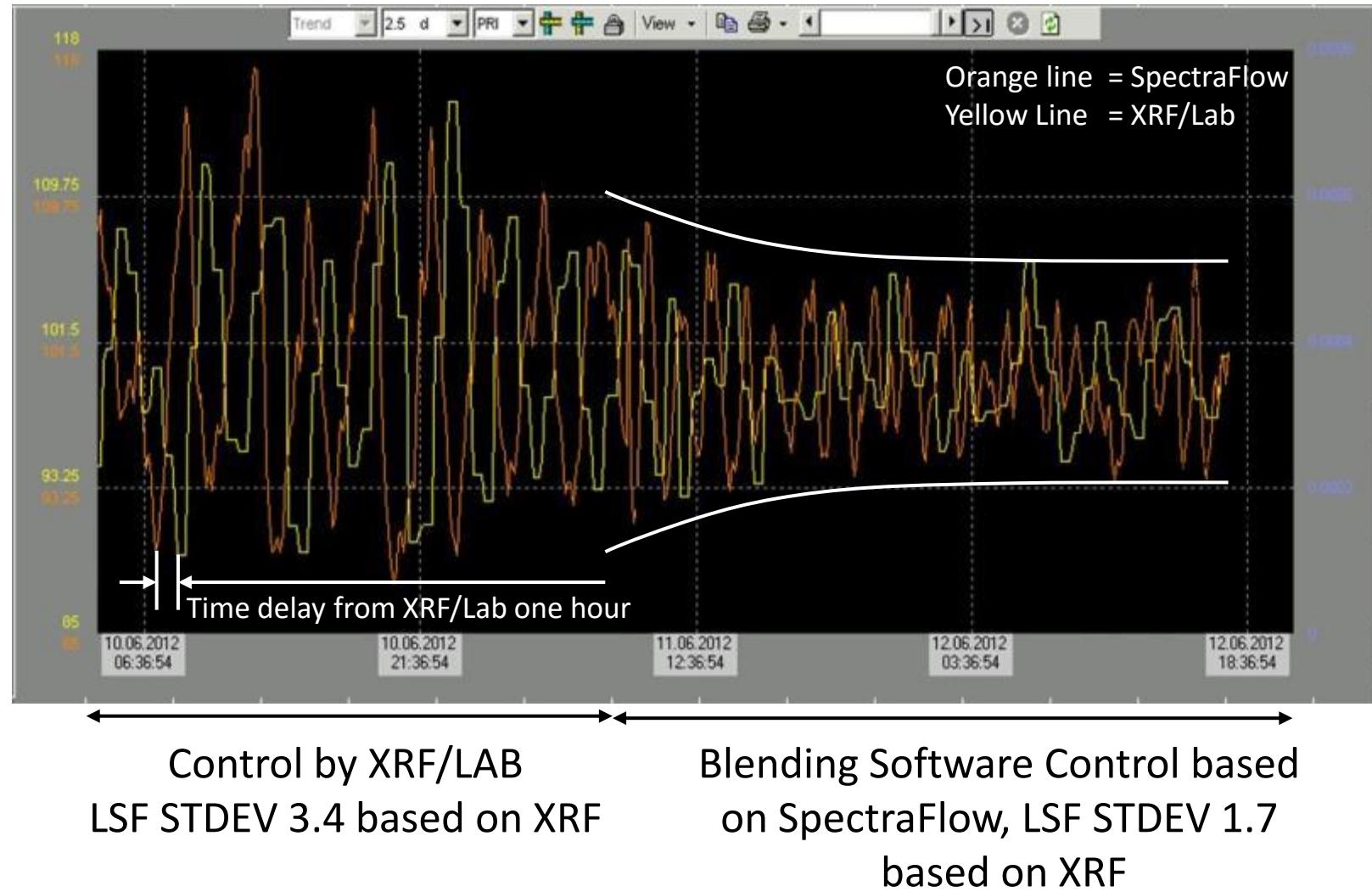


SiO_2



— XRF — SF

LSF Control Comparison



Airslide Application – Benefits & Advantages

Benefits:

- Real Time control of your raw-mix
- Kiln feed quality after raw mill
- Reduced requirement for homogenization
- Reduced fuel consumption

Advantages of SpectraFlow over conventional PGNAA analyzers:

- Only online analyzer to evaluate raw meal
- Independent of specific element concentrations (e.g. Fe₂O₃)
- XRF at same location



SpectraFlow On-Line Analyzer Summary

Summary

- No radioactive materials used
 - very low cost of operation and maintenance
 - no operational permits or extra personnel required
 - no risk to employees during operation or maintenance
- Most accurate measurement for raw meal:
 - raw meal can be controlled close to kiln feed quality
 - less need for homogenizing
 - lower fuel consumption in the kiln due to more stable kiln feed
- Not influenced by belt load variations or specific element concentrations (e.g. Fe_2O_3)

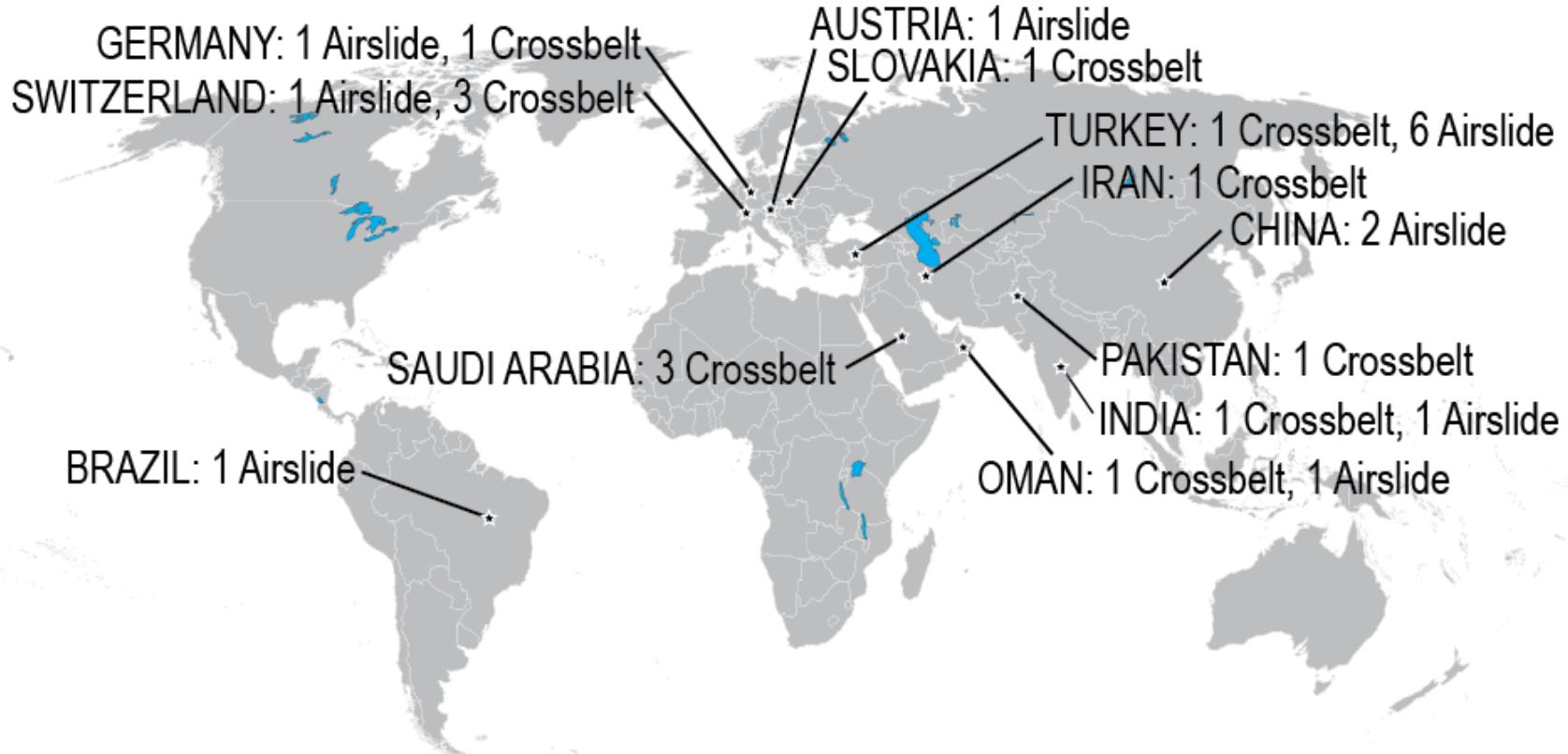


SpectraFlow On-Line Analyzer

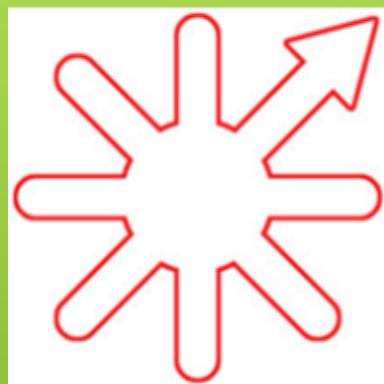
Reference List

SpectraFlow Applications – Reference list

REFERENCE LIST: 21 Analyzers commissioned, accepted and running in 11 countries
 7 Analyzers on delivery in 4 countries



THANK YOU FOR YOUR ATTENTION!



SPECTRAFLOW
ANALYTICS SWITZERLAND

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