

Challenges in Stack Gas monitoring and Solutions

Prakash Abhyankar

2021/02/17

Personal Introduction



Prakash Abhyankar

Segment Head P&E

Work record

2008-2018 Automotive Emissions

2018- till date Process & Environmental

Office:

HORIBA INDIA

246, Okhla India Estate

Ph III

New Delhi-110020



HORIBA INDIA activity in India

ISO9001:2015 for QMS
ISO14001:2015 for EMS
ISO 45001:2018 for
OASMS
NABL ISO IEC
17025:2005



Calibration Lab



Vehicle Test Cell



WQMS

***Certification and Accreditations for Engine Testing,
Vehicle Testing, Automotive Test Systems Design,
and P&E Manufacturing at HITC Pune***



Analyser manufacturing

Discussion point

History

- CPCB issued direction for online Emission monitoring in 2014
- 17 Industries came under RED category in FEB 2014
- Powerplants asked to reduce SOx & NOx and install FGD & SCR
- Many industries installed CEMS

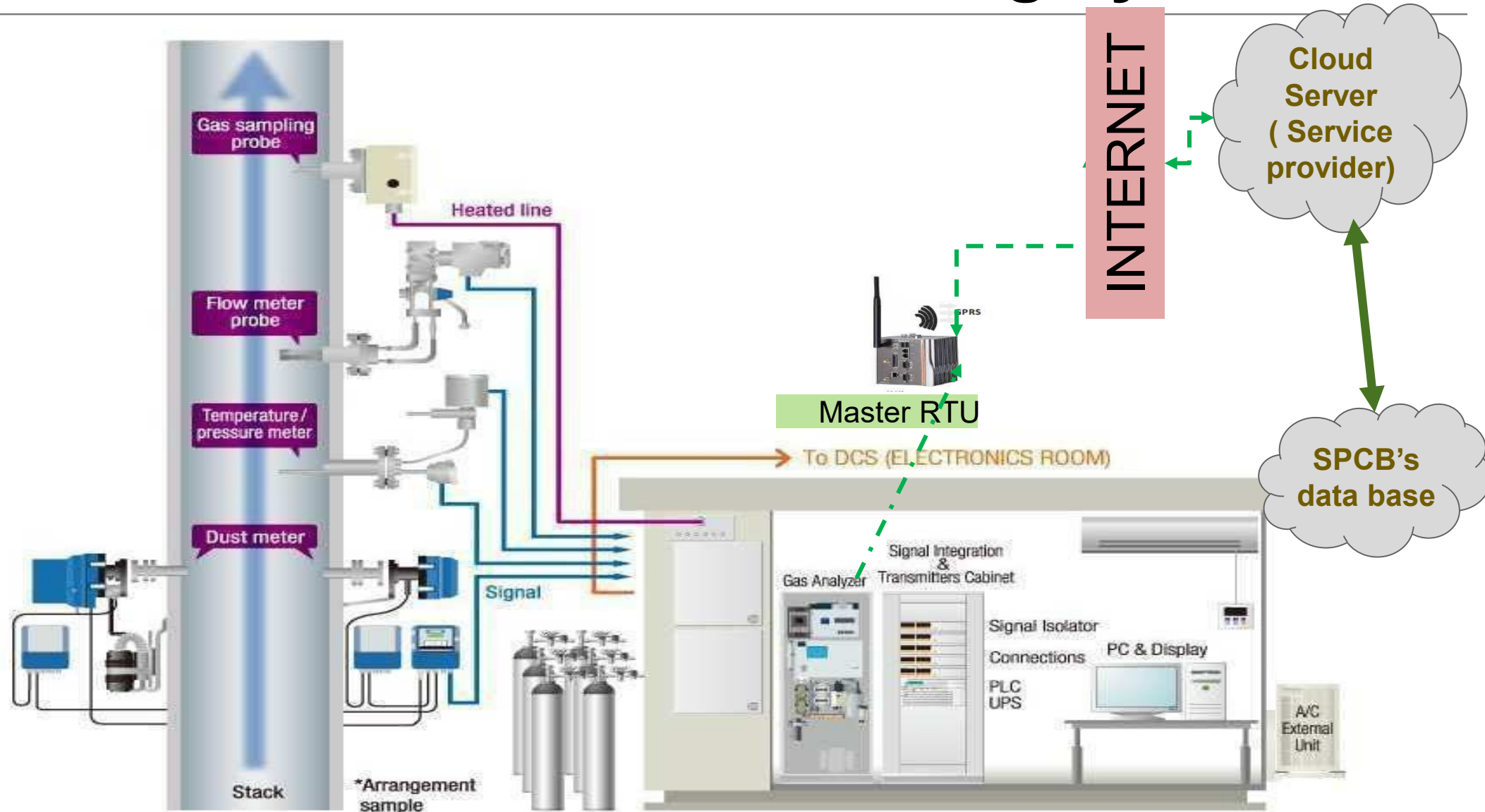
Points to Ponder

- How is the compliance status emissions regulation?
- Is there any inspection regime like Relative Accuracy Test Audit (RATA)
- What are the challenges in the field for installed CEMS

Today's topics

- **Type of CEMS**
- **Commonly used CEMS**
- **Challenges faced in field**
- **Core component and technology**
- **Conclusion**

Typical Continuous Emission Measuring System



Common challenges faced in field

- **Sample line chocking.**
- **Ceramic sample probe filter chocking due to fly ash and gas condensation & poor back flush**
- **Sometimes flue gas sample probe internals (filter, holding spring) gets eroded due to gas condensation.**
- **The insufficient heating capacity of heat trace line is also responsible for moisture condensation in sample line.**
- **Analyser drifting**
- **Calibration process very difficult for Insitu Analysers, poor quality control**
- **Quality of Dust free Air for Permeation dryer type extractive sampling, frequent chocking of dryer tube necessitating replacement of dryer**
- **Maintaining dilution ratio in a dilution CEMS**

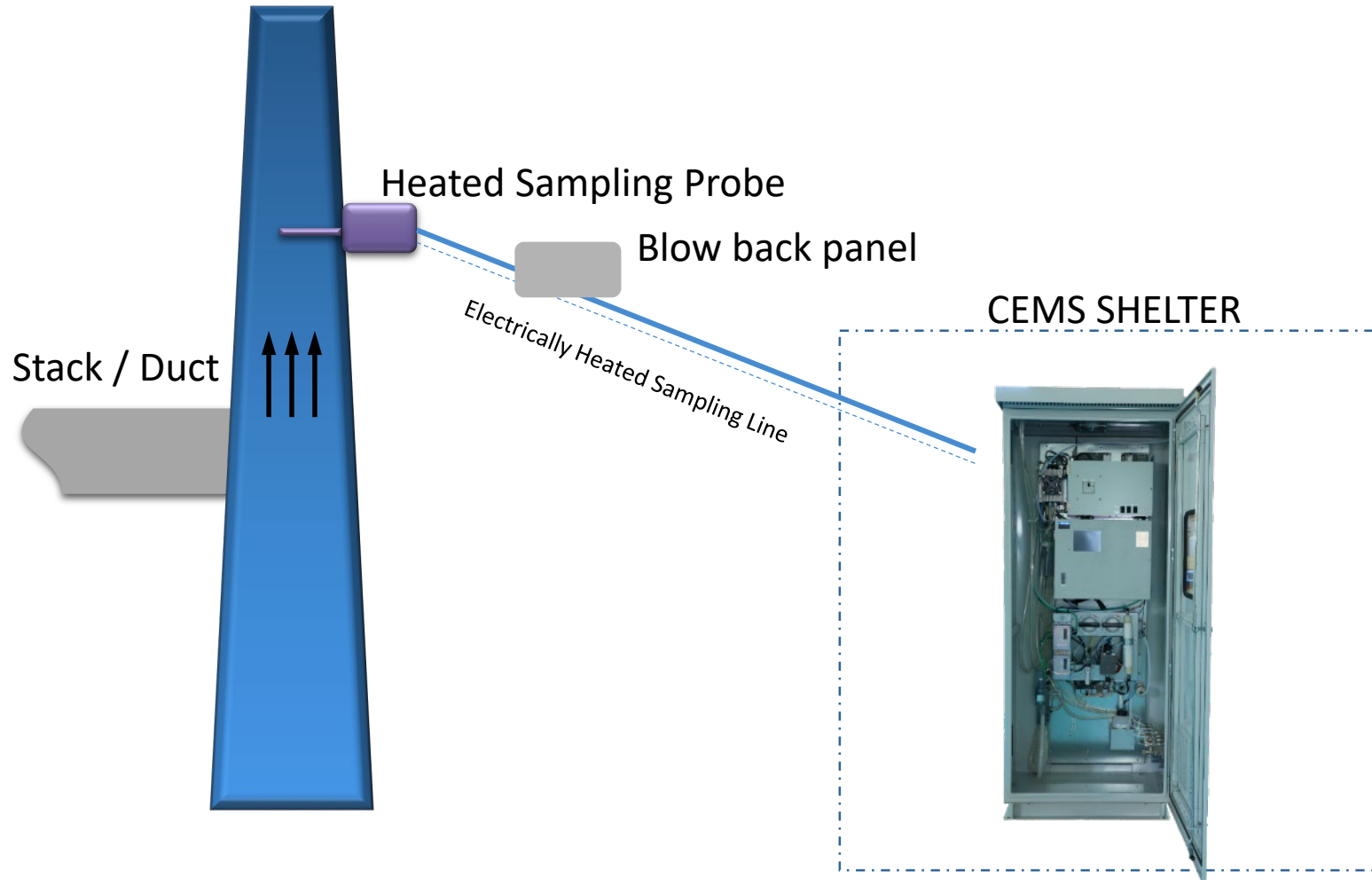
Commonly used CEMS technology

Sr.	Technology
1.	Extractive CEMS with heated sampling line
2.	Extractive CEMS with permeation dryer in sampling probe
3.	In-Situ CEMS
4.	Dilution CEMS

Commonly used CEMS technology

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Extractive CEMS with heated sampling line



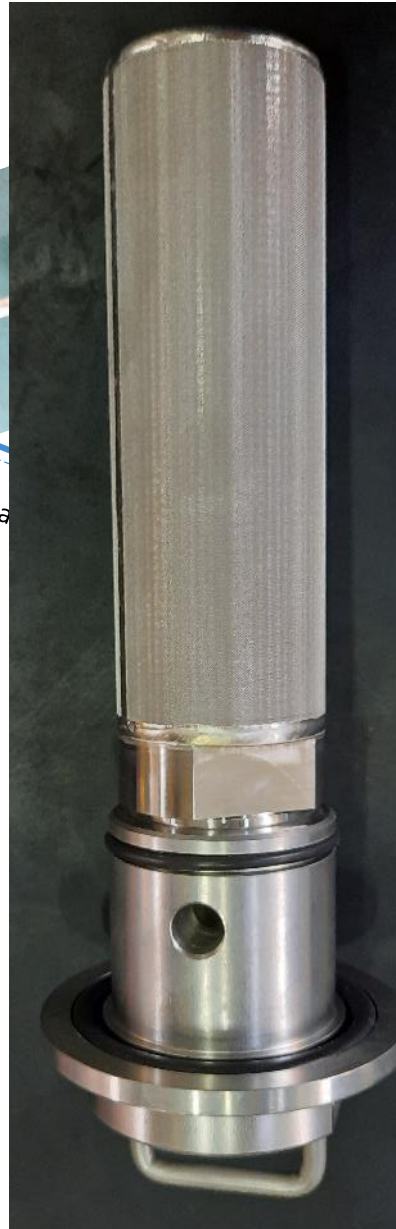
Sample gas is extracted from the stack by using of Heated Sampling Probe and transported to the CEMS Cabinet by Heated Sampling Line.

Typical distance is 5 to 30 meters, but sometimes up to 100 meters.

Extractive technology is mostly used for monitoring of SO₂, NO_x, CO, CO₂, O₂, TOC and Hg

Extractive CEMS with heated sampling line

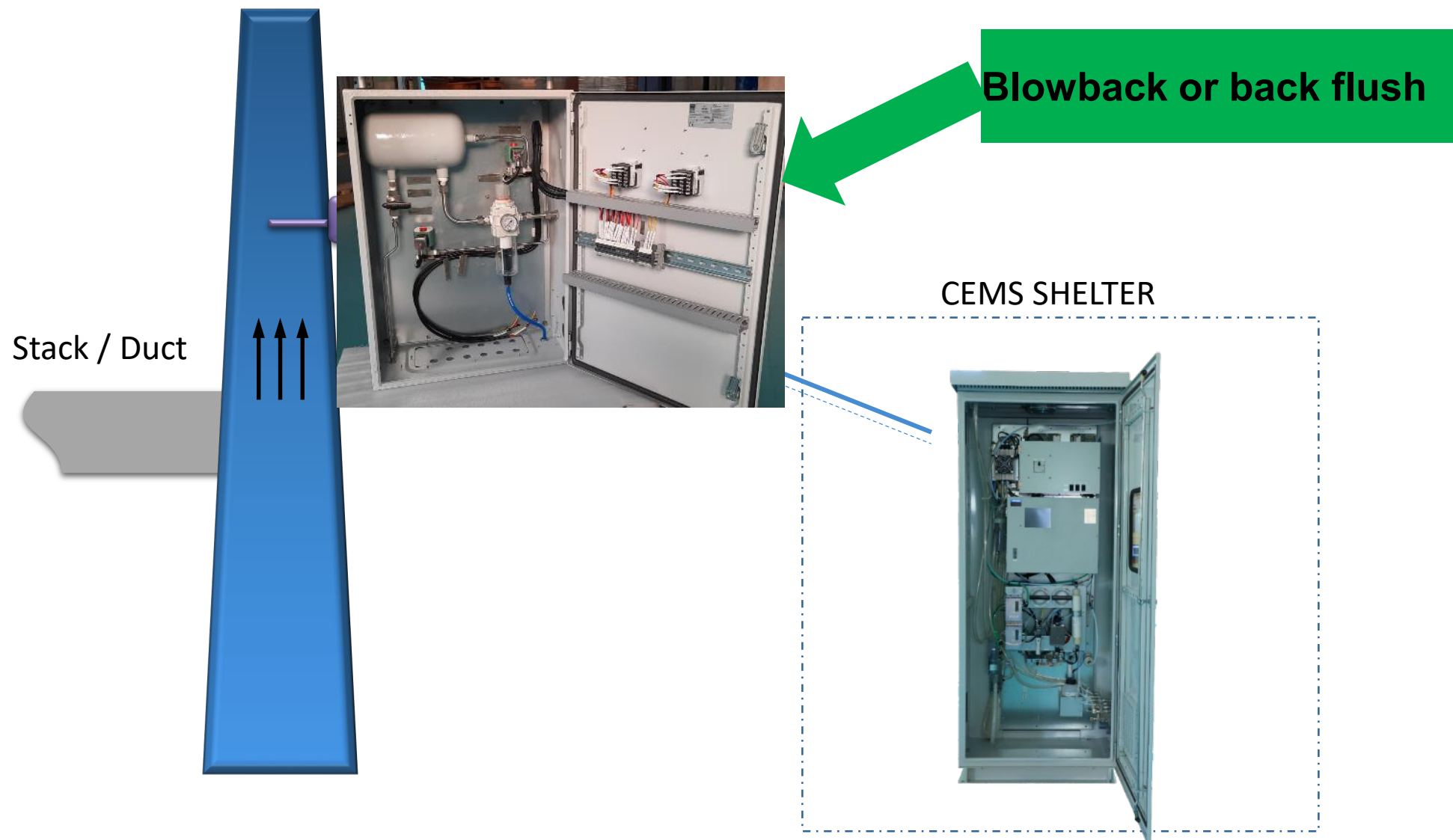
Advantages	Challenges
Complies with US EPA and European Regulations for CEMS	Necessity of laying the heated sampling line, complicated in case of long distance
Easy access to analyzer for maintenance and service	Certain power consumption in case of long distance between sampling point and analyzer cabinet
Easy quality control procedure	A time delay of sample gas transport in case of long distance between sampling point and analyzer cabinet.
Results of measurement are already related to Dry Gas Conditions and Standard Conditions (273 K and 1013,25 mbar)	
Good operational conditions for analyzer as only dry and conditioned gas enters the analyzer	



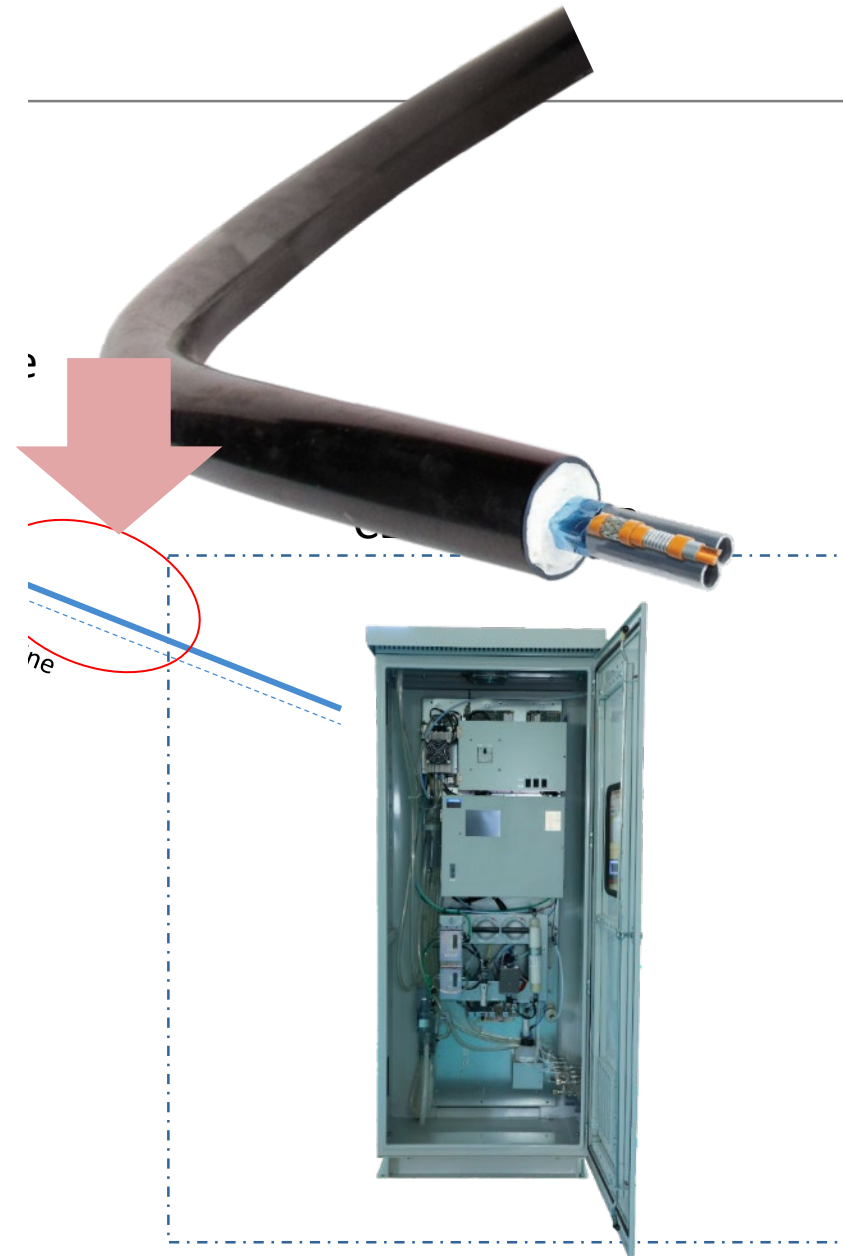
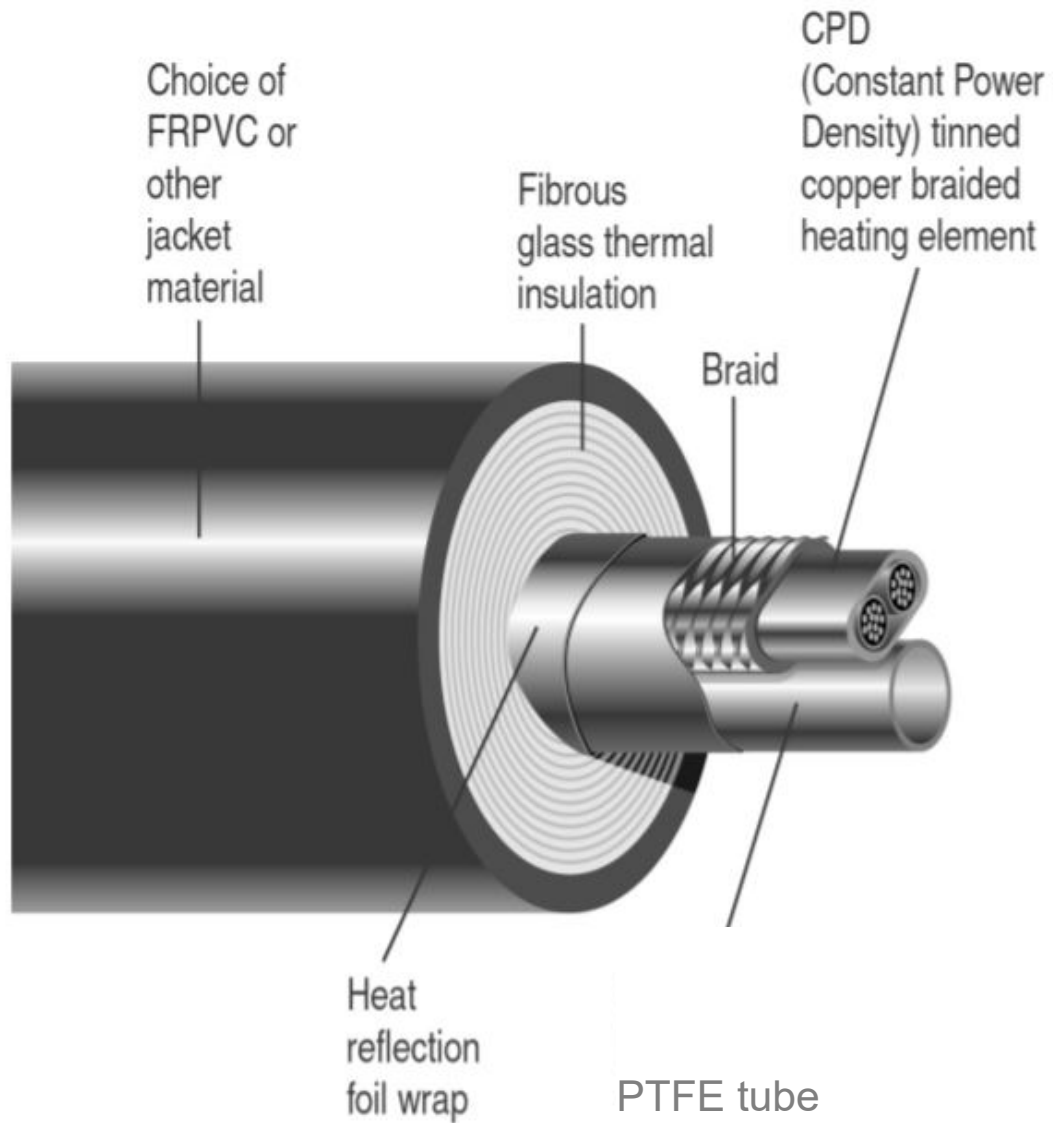
CEMS SHELTER



Blow back panel and heated line

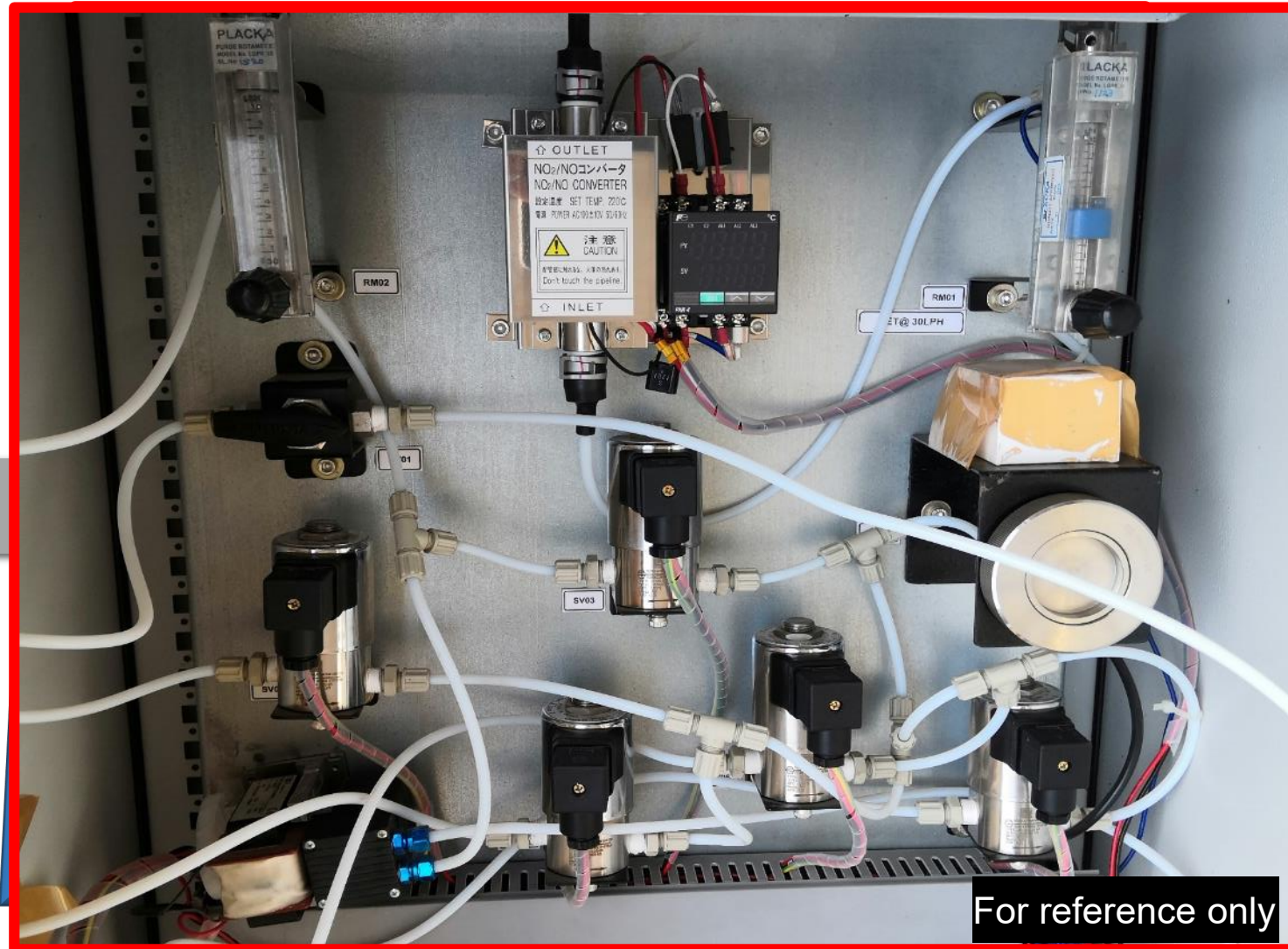


Heated line



Sample handling system

Stack / Duct



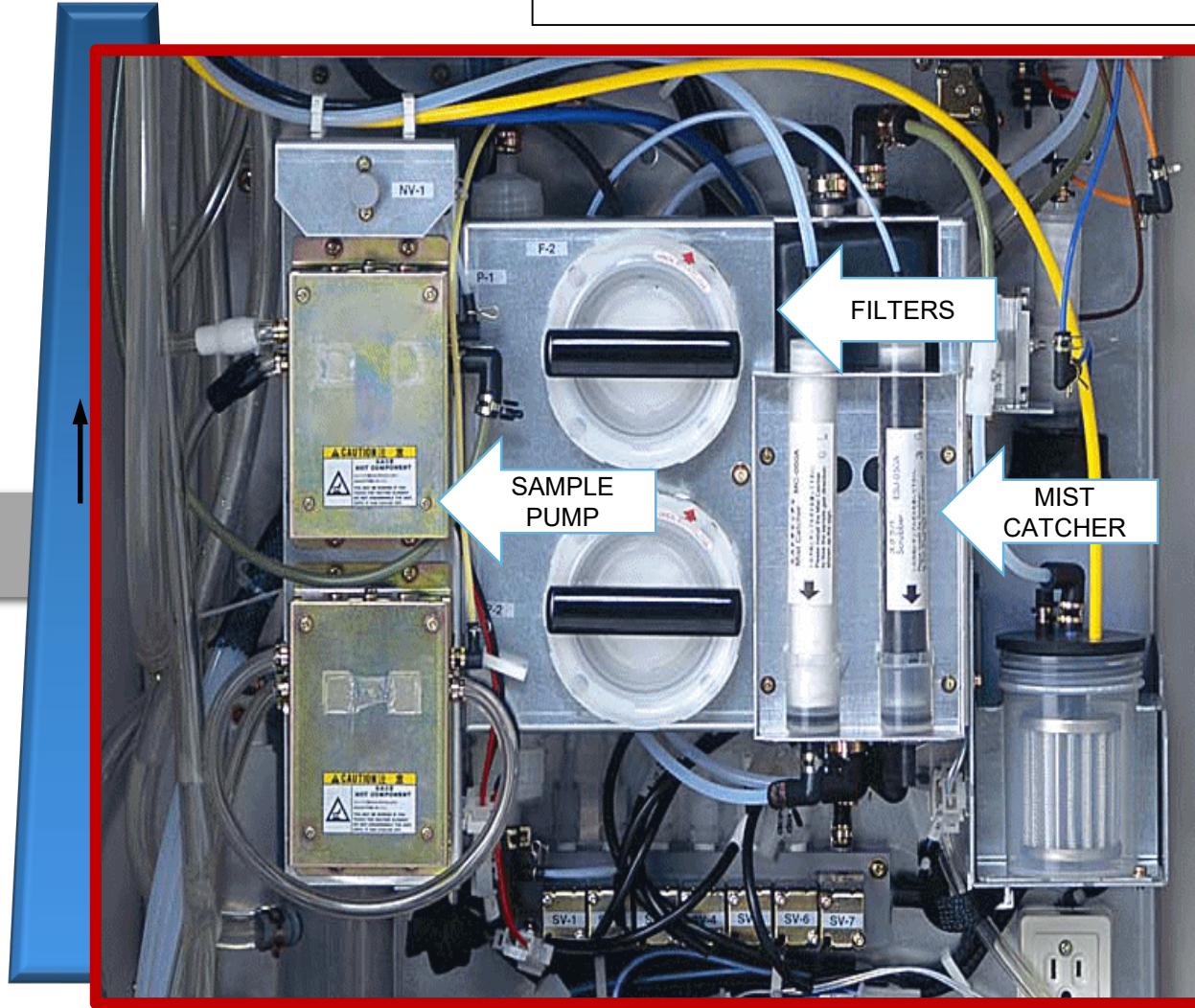
Pump
Cooler
Valve
Filters
Tubing

Sample handling system

HORIBA CORE SHS



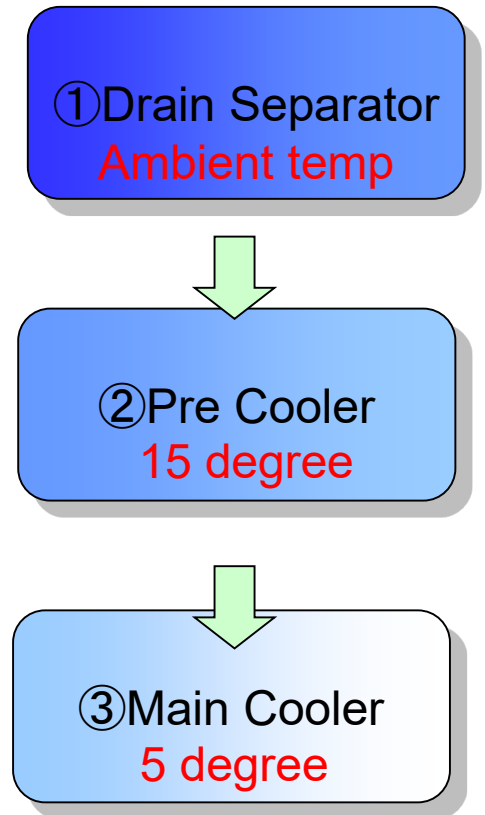
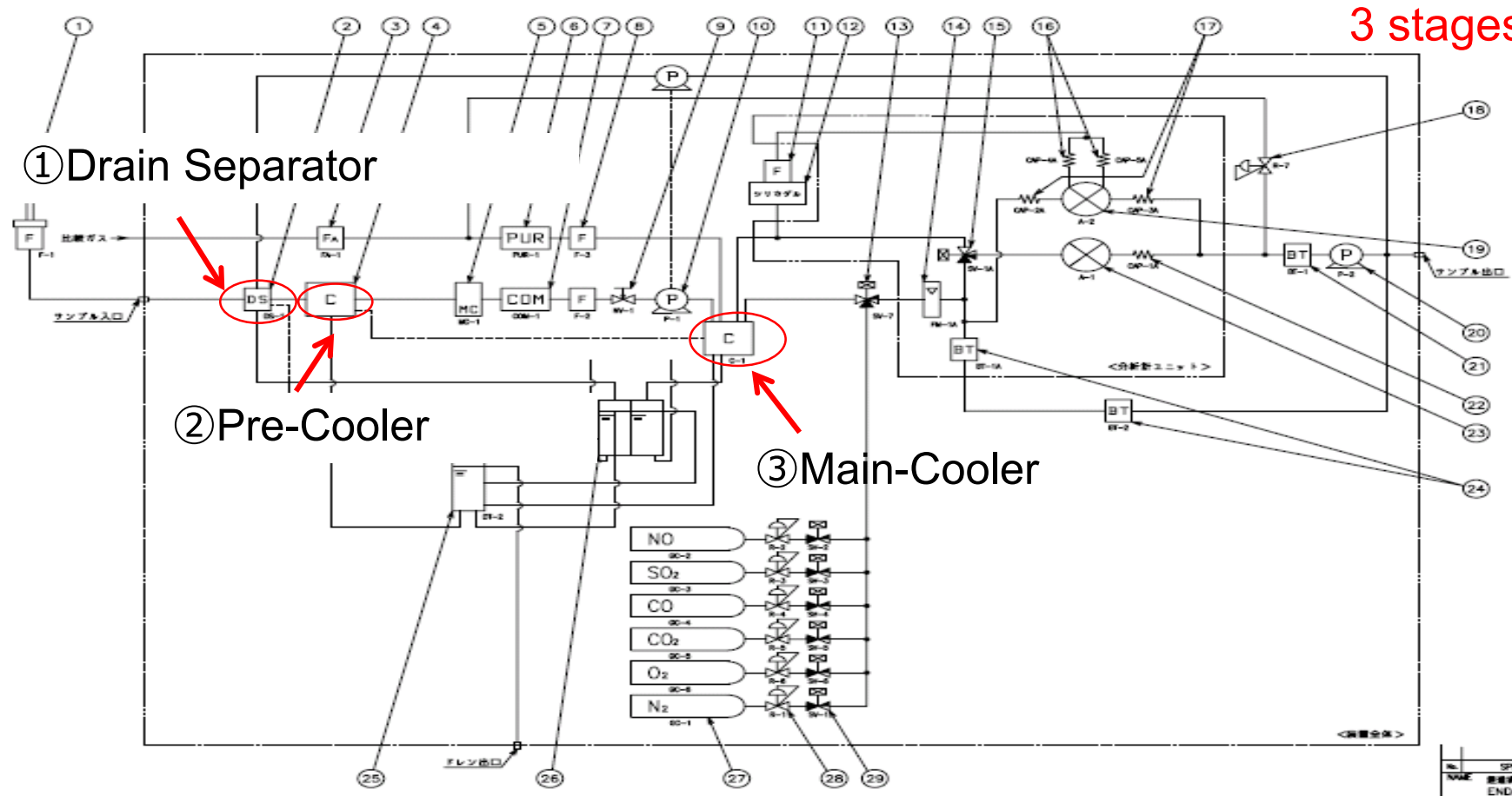
Sample / Duct



- Mist catcher
- Cl2 scrubber
- Halogen scrubber
- Special Drain separator

Provide Best Sampling system for each application

3 stages Dehumidifying System



- Minimizes dissolution loss of SO₂
- Up to 40% H₂O is endured by this system

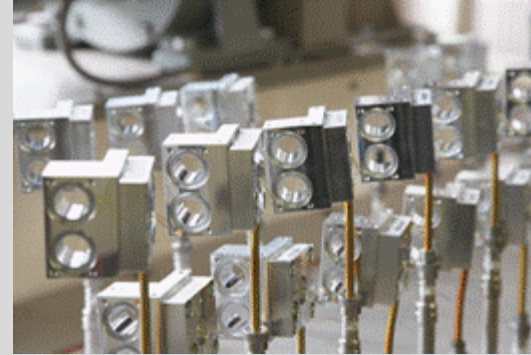
Analyser NDIR Key Optical components



Optical Filter



Optical module



NDIR Detector



E-HARBOR

Unify R&D, design, Engineering, manufacturing for Gas measurement technology and product

What is “SENGU”?

Tradition, Shrines are rebuilt every 20 years



ancient
architecture



To maintain the ancient architecture, and transfer the skill of carpenters to the next generation.

HORIBA transfers our Technologies and Philosophy to new factory and new generation



Technologies



Philosophy



Conclusion / Discussion point

Conclusion

- Like any machine Analysys Systems too need maintenance
- System design is very important for trouble free operation
- Cheapest always is not the best

→ **Quality things do come at cost but lasts long**



- **How is the compliance status emissions regulation?**
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Omoshiro-okashiku
Joy and Fun

おもしろおかしく

THANK YOU

Terima kasih
谢谢
Gracias
Σας ευχαριστώ πάρα πολύ
धन्यवाद
شُكْرًا
Danke
Tack ska du ha
Grazie
ขอบคุณครับ
Большое спасибо
Cảm ơn
감사합니다
Dziękuję
Merci
ありがとうございました