

# Accuracy Maintenance Training

## Minerals Slurry Analysers with a Product Support Agreement



### Course Overview

Accuracy Maintenance Training for 200 or 300 Series XRF elemental or PSM ultrasonic particle size Minerals Analysers and sampling equipment is a five day course that you should attend if you are involved in ensuring your significant equipment investment in sampling and on line analysis has high availability and optimal accuracy for process control. Participants will be able to operate, maintain and optimise calibration accuracy of the equipment smarter, safer, more consistently and more effectively.

The course is delivered at your site. Classroom and practical syllabus elements are strongly focused on your people and your sampling and analysis system.

The course is only available to sites that have a current Product Support Agreement because we know that once people complete the course they are always energised and keen to apply their new-found knowledge. They will inevitably have questions and need further support to implement changes to improve the operation, maintenance and accuracy of the equipment to the next level of performance where it is a crucial tool used for process control.

### Who Should Attend

End-user Metallurgical technicians, Plant Metallurgists, Lab or Operations Supervisors and Metallurgists who will be involved in operation, maintenance and calibration optimisation of any or all of the following Thermo Scientific slurry sampling & analysis equipment: Minerals Slurry Analysers and sampling equipment including AnStat 200, 220 and 230, AnStat-330, SamStat-20 and 30, MSA Mk5.0, Mk5.1, Mk5.2 and MSA-330, PSM-400MPX, WinISA version 2.2x software, Nautilus PSM software and all the related process samplers.

Since most maintenance is done by the end-users, this allows the Thermo Fisher service engineers to focus on maintaining the next level of end-user training and on supporting your personnel to optimise accuracy. This service & support is able to be provided under the Product Support Agreement.

## Minerals Slurry Analysis & Sampling Training Course Selection Guide

TRAINING COURSE					
<i>Trainees Who Attend</i>	Operation & Maintenance (at Commissioning)	Operation & Maintenance (with a Product Support Agreement)	Factory Operation & Maintenance Training	Accuracy Maintenance (with a Product Support Agreement)	Advanced Accuracy (with a Product Support Agreement)
Location	Your Site	Your Site	Factory	Your Site	Your Site
Duration	2-3 days	4 days	4 days	5 days	5 + 4 days
Maintenance Operators	1	2	2		
Metallurgical Technicians	1	2	2	3	4
Instrumentation / Electrical	1	2	2		
Plant Metallurgist, Lab or Operations Supervisors	1	1		2	3
Plant/Operations Managers or Senior Managers	1			1	

**1 = Start here first**

**2 = Second training to attend**

**3 = Third training to attend**

**4 = Fourth training to attend**

### Learning Outcomes

Attendees who complete the course will be able to safely and effectively perform the operation, recommended maintenance and calibration of Thermo Scientific 200 or 300-series or PSM slurry sampling & analysis equipment with only partial support from Thermo Fisher Scientific service engineers and other support services. They will have a clear understanding of how the Thermo Scientific sampling & analysis equipment is able to be used to optimise the process, and the knowledge to interpret the current equipment status, factors affecting accuracy, and to actively manage the accuracy of the equipment calibration.

### Prerequisites

- Current Product Support Agreement
- Able to recognise the basic system components (sampling, analyser, computer) and their overall purpose.
- Attended Operation & Maintenance training during system commissioning or PSA Operation & Maintenance training or Factory Operation & Maintenance training
- Be involved in the calibration maintenance of the analyser

### Your Business Benefits

Operations will see these immediate and ongoing benefits from investing in training on Accuracy Optimisation for 200 or 300 Series or PSM Minerals Slurry Analysers and sampling equipment:

- Scheduled maintenance tasks are performed smarter, safer, more consistently and more effectively
- Better sampling & analysis system availability
- Optimised sampling & analysis system accuracy for crucial process control applications
- Greater confidence in the assay data provided by the sampling and analysis equipment



## Training Course Syllabus

### 200 or 300 Series Analysers

1. Overview of the multi-element probe, sample presentation, measurement, analysis and reporting techniques.
  - a. X-ray Theory
  - b. Radioisotopes
2. Multi-Element Probe (aspects that affect accuracy)
  - a. Components & their functions
  - b. Probe cooling system
  - c. Source safety
3. Signal Analyser (aspects that affect accuracy)
  - a. Components & their functions
  - b. Setup
  - c. Health condition checks and Resolution
4. Sample presentation system
  - a. Primary sampling
  - b. The Measurement Zone
  - c. The Metallurgical Sampler
  - d. Calibration and shift sampling, collection, processing and analysis
5. Standardisations
  - a. Why, How, When
  - b. Stability Test and Stability Program in the server. Stability file types.
  - c. Automatic Resolution Management and AutoStability (300 Series only)
  - d. Stability and Consistency Evaluation
  - e. Methods to solve unsuccessful evaluation results
    - I. Trend Analysis
    - II. Spectra Analysis
6. Calibration
  - a. Theory and Rules. Errors
  - b. Using the RARP regression program (practical)
    - I. Regressing equations
    - II. Applying Equations
  - c. Measurement Period and related errors
  - d. Advanced techniques (practical)
    - I. Solids Correction
    - II. Effect on large number of samples
    - III. Effect from mineralogy changes
    - IV. Effect of the concentration range
    - V. Multiple Equations
    - VI. Non Linear Equations
7. Accuracy maintenance and Performance monitoring
  - a. Review of scheduled maintenance
  - b. Shift samples vs calibration check samples
  - c. Accuracy Performance Check methods
    - I. Instrument Control Method
    - II. Laboratory Control Method
    - III. Sampling Control Method
    - IV. Equation Control Methods
    - V. Expected Accuracy Performance
8. Limitations in Accuracy
  - a. Different Limitation Effects
    - I. Low Solids
    - II. Spectra Interference
    - III. Low Concentration and Detection Limit
    - IV. Attenuation - Matrix - Mineralogy
    - V. Particle Size
  - b. How to overcome Limitations or alternatives

### PSM-400MPX

1. Review of the particle size monitor's sample presentation, measurement, analysis and reporting techniques and requirements.
2. Sample Intake and Conditioning System
3. Water plumbing tree, water quality
4. Sample conditioner
  - a. Hardware function
  - b. Control panel
  - c. Aspects that affect accuracy
5. Sample presentation and measurement
  - a. Sample Analysis Module
  - b. Ultrasonics
  - c. Aspects that affect accuracy
6. Control and Display Module
7. Standardisation Water Module
8. Operation
  - a. Theory
  - b. Practical
9. Maintenance
  - a. Scheduled maintenance responsibilities
  - b. Accuracy maintenance and Performance monitoring
10. Standardisation method
  - a. Method
  - b. Handling standardisation issues
11. Sample Collection
  - a. Optimal methods
  - b. Minimising sources of error
12. Server - Nautilus software
  - a. Communications
  - b. Calibration and Monitoring
  - c. File Wizard
  - d. AutoComm and Autocon
  - e. Advanced calibration techniques
  - f. Practical
13. Troubleshooting
14. Overcoming Limitations in Accuracy
  - a. Within the PSM
  - b. Within the material
  - c. Other factors

## About Thermo Fisher Scientific

Thermo Fisher Scientific is the original equipment manufacturer for all the 200 and 300 Series Minerals Slurry Analysers and sampling equipment including AnStat 200, 220 and 230, AnStat-330, SamStat-20 and 30, MSA Mk5.0, Mk5.1, Mk5.2, MSA-330, PSM-400MPX, WinISA version 2.2x software, Nautilus PSM software and all the related process samplers.

Thermo Fisher Scientific is the world leader in serving science, with revenues of more than \$20 billion and approximately 70,000 employees globally. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Through our premier brands – Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services – we offer an unmatched combination of innovative technologies, purchasing convenience and comprehensive services.

## About the Trainers

All Thermo Fisher Scientific Accuracy Maintenance trainers for 200 or 300 Series or PSM Minerals Slurry Analysers and sampling equipment have a high standard of competency tested experience in commissioning, maintenance and support of the equipment and its users. The training material has been designed and created by a team led by our qualified training coordinator, and the trainers have been trained by the training coordinator to ensure you always receive a consistently high standard of training and service.

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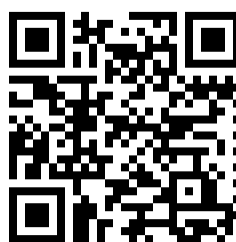
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## Contact Us

To find out more about training you and your maintenance team who look after the 200 or 300 Series or PSM Minerals Slurry Analysers and sampling equipment, and other ways Thermo Fisher Scientific can help your business:

- Go to [www.thermofisher.com/mineralservice](http://www.thermofisher.com/mineralservice)
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