



Application Note AN-RS-031

# Simplified RMID Model Building

## Mira Cal P and ModelExpert

Material verification models with complex algorithms such as Principal Component Analysis (PCA), quasi-infinite parameters, and preprocessing options can be incredibly complex. Each model must be rigorously built, evaluated, and validated before it can be put into routine use. Typically, this can take even a highly-trained chemometrician days to complete.

Mira P simplifies material verification for all. With a short, defined user workflow, straightforward

results, and a foolproof Operating Procedure-based design, Mira P is already one of the simplest RMID tools available. ModelExpert, in Mira Cal P, does a chemometrician's work. ModelExpert automatically determines the best model parameters for robust method development. Simply collect Training Set and Validation Set data and ModelExpert will optimize sample analysis. With Mira P and ModelExpert, even non-technical users can achieve better results in a fraction of the time.

## INTRODUCTION

ModelExpert is a function integrated into Mira Cal P that optimizes model parameters using Training Set and Validation Set samples provided by the user. This routine iterates 192

## DESCRIPTION

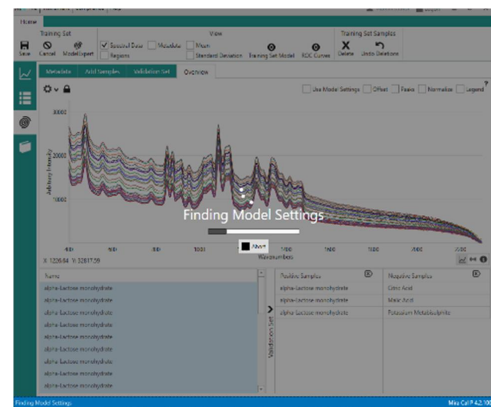
ModelExpert leverages the power of receiver operating characteristic (ROC) curves in automated model parameter determination. ROC curves are an integral part of evaluating Machine Learning models. The ROC approach ranks combinations by Area Under the Curve

## METHOD

To use the ModelExpert function, the user first creates a new Training Set in Mira Cal P. ModelExpert is located under Training Sets in the vertical menu. Once ModelExpert is selected, the software automatically runs all possible combinations of model settings (e.g., normalizations, baseline removal, principle components) for the given data while 'Finding Model Settings' is displayed (Figure 1).

combinations of statistical parameters to ensure that optimal model settings are being applied to customer sampling.

(AUC) score. ModelExpert ranking also includes a *posteriori* knowledge about which combinations perform better than others, in addition to penalizing combinations that produce False Positives/Negatives at the given confidence interval.



**Figure 1.** Mira Cal P screenshot during ModelExpert routine.

## RESULTS

ModelExpert results appear in a popup window, (Figure 2). This window summarizes the resulting ModelExpert settings. A PDF report containing more information about model settings, ROC curves, and validation samples with associated pvalues may be generated. Once 'Save Training Set' is selected, all optimized model parameters are applied to the associated Training and Validation Sets.

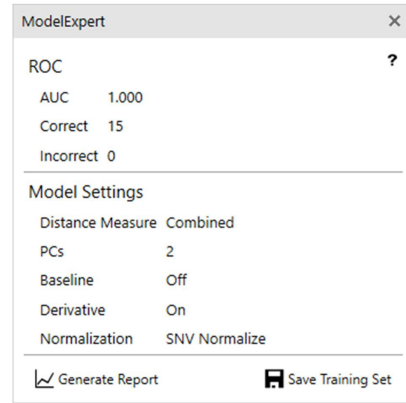


Figure 2. Popup window with ModelExpert Results.

## CONCLUSION

Overall, the ModelExpert function is a simple and transparent method of generating optimal parameters and sample data processing using customer data, all with a few simple clicks in

Mira Cal P. Metrohm Raman is dedicated to offering the simplest, most efficient and accurate use of Mira P for RMID.

## CONTACT

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## CONFIGURATION



### MIRA P Advanced

Metrohm Instant Raman Analyzer (MIRA) Pは、迅速な非破壊的計測および薬品有効成分や賦形剤などの様々な物質の検査に使用できる、高性能な携帯型ラマン分光計です。サイズはコンパクトですが、MIRA Pは非常に堅固で、弊社独自の軌道ラスタースキャン技術 (Orbital Raster Scan Technologie, ORS) を備えた作業効率の高い分光技術構造を有しています。MIRA PはFDA規則 21 CFR Part 11の要件を満たしています。

Advanced Packageには、物質を直接、またはオリジナル容器で分析することが可能なアタッチメントレンズ (レーザークラス3b)、およびガラスハイアル中のサンプル分析のためのハイアルホルターアタッチメント (レーザークラス1) が含まれています。