

# APS pro Aerosol Provocation System

Research has demonstrated that the single-concentration dosimeter method provides values comparable to the Gold Standard <sup>1</sup>

The integrated design of APS pro allows bronchial provocation protocols to use a single concentration of the challenge substance, making bronchial provocation testing cost effective, easier to perform and increase workflow efficiency.

Computer controlled nebulization guarantees the amount of drug inhaled is reproducible. While on-line observing the patient's breathing pattern in a flow/time diagram the inhalation of the challenge substance can be controlled.

The two modes of administration, i.e. pulse or continuous nebulization, allow for a broad age range to be tested.



## Highlights

- APS pro integrates into CareFusion MasterScreen instruments - Spirometry, IOS Impulse Spirometry, Rocc and Bodyplethysmography
- Fast drug delivery and high deposition through the side-stream nebulizer
- Intelligent SentrySuite™ software guides the user through the entire measurement process - automated workflow steps
- Comprehensive hygiene solution - disinfectable parts with a high efficiency filter to eliminate the risk of cross-contamination

# APS pro in three steps - Create, Nebulize, Observe

The SentrySuite™ measurement programs and provocation program work hand in hand. User-specific protocols and observation modules can be created to optimize workflow and maximize clinical output.

## Step 1 - Create

You are free to select from commonly used pre-set protocols or "Create Your Own". Various building-blocks make up the provocation protocol, e.g. type of provocation, number of steps, substance and concentration, dose to be administered, nebulization and exposure time. The observation module can be fully customized as well, i.e. reference parameters for contra-indication during the baseline measurement, provocation thresholds (PD/PC), layout of table and response graph and protocol steps.

Level	Concentration	Dose	Cumulated	Substance	N.time	Breaths	N.power	Exposure time 1	Exposure time 2	Dosing interval	Mode of application
B1								0.0	min 0.0	min 0.0	min No application
P1	16 mg/ml	0.015 mg	0.015 mg	Methacholin	0.224 s	1	240	mg/min	2.0	min 0.0	min APS pulse nebulizer
P2	16 mg/ml	0.045 mg	0.06 mg	Methacholin	0.352 s	2	240	mg/min	2.0	min 0.0	min APS pulse nebulizer
P3	16 mg/ml	0.18 mg	0.24 mg	Methacholin	0.560 s	5	240	mg/min	2.0	min 0.0	min APS pulse nebulizer
P4	16 mg/ml	0.5 mg	0.74 mg	Methacholin	0.880 s	9	240	mg/min	2.0	min 0.0	min APS pulse nebulizer
P5	16 mg/ml	0.72 mg	1.46 mg	Methacholin	0.865 s	13	240	mg/min	2.0	min 0.0	min APS pulse nebulizer
D1		2 Puffs	2 Puffs	Sulfamol				5.0	min 0.0	min 0.0	min Entry of single dose

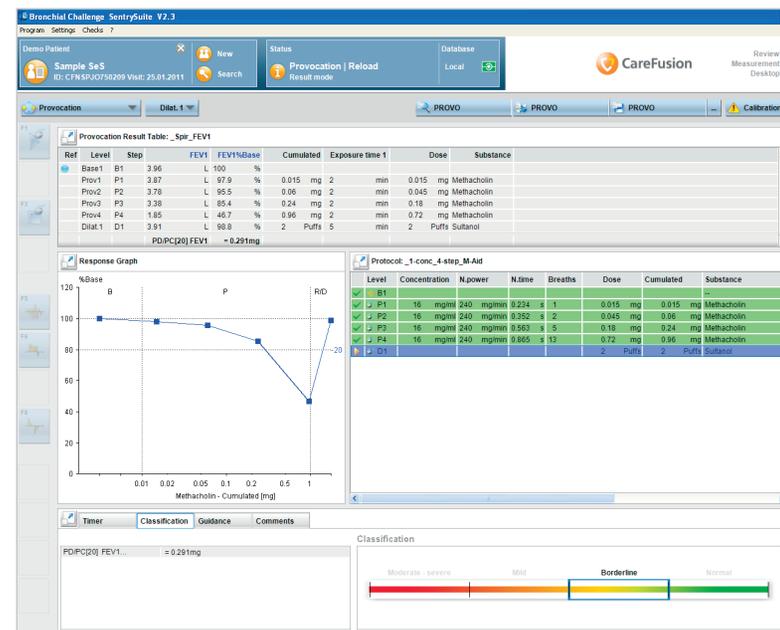
## Step 2 - Nebulize

You can choose out of two modes of administration, i.e. pulse or continuous nebulization. The process is time and volume controlled so that the highest drug efficiency is guaranteed. After each provocation step the software calculates the actual dose that has been administered. When the pre-set dose has been achieved the compressor automatically switches off.



## Step 3 - Observe

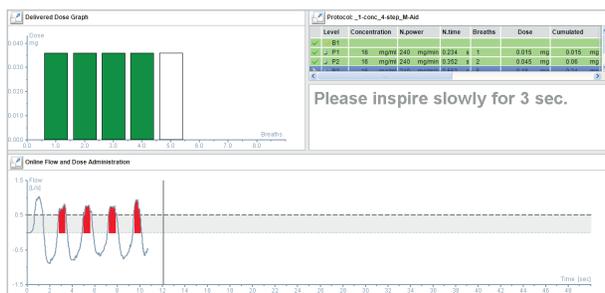
The build-in intelligence of the observation module ensures patient safety whilst achieving accurate provocation thresholds (automated PD, PC calculation). After the initial baseline measurement to exclude a contra-indication, the software monitors the patient's response to each provocation step. It either automatically progresses to the next provocation step or flags that the pre-set provocation level has been achieved.



### Provocation protocol

Parameter	Base measurement, contraindication	Subsequent measurements, warning	PD/PC assignment	absolute PD/PC
FEV1 (%)	Absolute	Absolute	90	-20

### Observation module



Stay in control during nebulization - breath-by-breath drug administration and standardization of inhalation

SentrySuite™ takes bronchial provocation to the next level

<sup>1</sup> R. Köbrich, N.J. van Duijn, R. Lauschner, P.J. Sterk; Jaeger Toennies GmbH, Höeherberg, Germany; Lindopharm GmbH, Hilden, Germany; Dept. Pulmonology, Leiden University Medical Center, Leiden, The Netherlands

# Patient safety holds the priority

Each protocol step triggers an automated feedback to the operator, i.e. either through a clear notification the operator is warned to abort the provocation and start a dilatation, or guided to continue with the subsequent provocation step.

**Bronchial Challenge**

 **Value(s) of the base measurement are outside of acceptable predicted limits.**  
It is not recommended to start a provocation sequence.

**Do not start a provocation sequence. (recommended)**  
Because the base measurement is outside of acceptable limits compared to reference values no provocation sequence should be performed.

**Continue nevertheless with a provocation sequence**  
Additional provocation steps or observation measurements can be performed. (not recommended)

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## Contra-indication

**PROVO.EXE**

 **Inspiration was aborted prematurely.**  
Only a part of the provocation dose was administered. Please select how to proceed with the uncompleted breath.

**Accept the breath**  
The decreased dose will be overtaken. Nebulization will go on with the next breath.

**Retry the breath**  
The already administered dose will be ignored and the last breath will be repeated.

 The administered dose for this inspiration was 0.011 mg instead of 0.036 mg.

## Aborted inhalation

**Bronchial Challenge**

 **It is recommended to start a dilatation step.**  
Value(s) [current or last level] are outside of acceptable limits.  
PDI/PC[20] FEV1 Cumulated: = 0.089mg

**Start dilatation step. (recommended)**  
Because the measures values of the current level are outside of acceptable limits, it is strongly recommended to start the dilatation step.

**Continue nevertheless with a provocation sequence**  
Additional provocation steps or observation measurements can be performed. (not recommended)

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## Provocation threshold

## APS pro features

- Specific and non-specific bronchial provocation testing
- Single and multiple concentration bronchial provocation testing
- Highest level of patient safety and measurement accuracy ensured through build-in, automated feedback, i.e. guidance and warnings
- Automated calculation of the PD or PC at user defined end of test criteria based on FEV1, R5, Fres, sRaw, sGaw, etc.
- Real-time visualization of dose administration and breathing patterns
- APS pro assists the entire provocation workflow and timing intervals between the various doses
- Adjustable disease classification bar based on PD or PC provocation threshold
- Broad age range, from adult down to infant

## APS pro seamlessly integrates into the MasterScreen family of products

**Bronchial Challenge**

 **Substance and/or concentration has changed in protocol.**  
Please exchange the nebulizer box.

OK

## Exchange nebulizer box



## IOS with integrated APS pro

## SentrySuite™ takes bronchial provocation to the next level

SentrySuite software, or SeS, is a unique collection of software applications designed to help improve productivity and efficiency.

The Guidance instructional application helps technicians coach their patients through the actual measurement with intelligent text and graphical messages designed to maximize patient performance and meet quality criteria such as ATS/ERS recommendations.

 **CAUTION** - U.S. Federal Law restricts this device to sale by or on the order of a physician.

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