

## Specification CombiScope FTIR 300 HP

### Instrument characteristics

Analysis capacity (instrument speed)	300 samples/hour
IR principle	Fourier Transform Infrared Rotation scanning mechanism
Somatic cell counter principle	LED flow cytometer
Sample intake	9 ml (programmable 7-10 ml)
Carry-over	< 1% for fat, protein, lactose, total solids, somatic cell count
Required sample intake temperature	35-41 °C
Operating system	Windows 7 & 10
Operating interface	Touchscreen, keyboard, mouse
Data transfer	UTP
Type	Desktop
Weight	Approx. 330 kg.
Dimensions	230x80x70 cm
Power consumption	750 nominal (1200 VA max)
IP classification	IP22
Instrument accessories	<ul style="list-style-type: none"> <li>• Wheeled stainless steel system table</li> <li>• Freezing point depression (FPD)</li> <li>• Unidirectional barcode reader</li> <li>• 360° barcode reader</li> </ul>

### Performance specifications of the standard FTIR calibration models (filter and full spectrum PLS)

All parameter calculated conform IDF 141/ISO 9622

	Fat (%m/m)	Protein (%m/m)	Lactose (%m/m)	Total Solids (%m/m)	NPN-CU (mg/100g milk)	FPD (m°C)
Measurement range	0 – 15%	0 – 10 %	0 – 10%	0 – 20%	10 – 100	400 – 600
Performance range	2 – 10%	0 – 7%	2 – 6%	6 – 20%	10 – 70	450 – 550
Repeatability specification	Sr < 0.010	Sr < 0.010	Sr < 0.012	Sr < 0.025	Sr < 1.5	Sr < 0.5
Repeatability typical	Sr = 0.004	Sr = 0.004	Sr = 0.006	Sr = 0.012	Sr = 0.9	Sr = 0.27
Reproducibility specification within lab	SR < 0.020	SR < 0.020	SR < 0.020	SR < 0.050	SR < 2.8	SR < 1.5
Reproducibility typical within lab	SR = 0.010	SR = 0.010	SR = 0.014	SR = 0.025	SR = 2.0	SR = 0.85
Accuracy specification bulk tank milk	Syx% < 1.0%	Syx% < 1.0%	Syx% < 1.0%	Syx% < 1.0%	Syx% < 4.0	Syx% < 4.0
Accuracy typical bulk tank milk (based on combined tests)	Syx% = 0.40%	Syx% = 0.50%	Syx% = 0.70%	Syx% = 0.40%	Syx = 2.5	Syx = 2.8

### Performance specifications of the Herd Management Tools FTIR fatty acids calibration models (full spectrum PLS)

	De novo fatty acids (bulk tank milk in g/100g milk)	Mixed origins fatty acids (bulk tank milk in g/100g milk)	Preformed fatty acids (bulk tank milk in g/100g milk)	Blood NEFA predicted in milk (individual cow in µEq/l)
Measurement range	0.05 – 1.85	0.05 – 2.05	0.05 – 2.55	200 - 1860
Repeatability specification				Sr < 60
Repeatability typical	Sr = 0.010	Sr = 0.015	Sr = 0.030	Sr = 30
Accuracy specification				Syx% < 172
Accuracy typical	Syx = 0.025	Syx = 0.045	Syx = 0.055	

### Somatic cell counter: MicroVal certified

All parameter calculated conform IDF 148-2/ISO 13366-2, ISO 8196-3, EURL MMP criteria and MicroVal certification scheme

Measurement range cells/ml	0-10000K		
Performance range cells/ml	0-2000K		
	Repeatability specification	Repeatability typical	Accuracy specification
100K cells/ml	Sr% < 4.5%	Sr% = 3.5%	Syx% < 10%
300K cells/ml	Sr% < 3.0%	Sr% = 2.0%	Syx% < 10%
500K cells/ml	Sr% < 2.0%	Sr% = 1.5%	Syx% < 10%
2000K cells/ml	Sr% < 2.0%	Sr% = 1.5%	Syx% < 10%

### Terminology

#### Milk components:

Reference methods: Fat [ether extraction], protein [Kjeldahl], total solids [oven method], NPN-CU [pH method], FPD [cryoscopic method]

Sr: standard deviation of repeatability conform IDF 141/ISO 9622

SR: standard deviation of reproducibility conform IDF 141/ISO 9622

Syx: standard deviation of accuracy conform IDF 141/ISO 9622

Syx% = Cv: relative standard deviation of accuracy conform IDF 141/ISO 9622

Sd: standard deviation of differences of the uncorrected signals conform IDF 141/ISO 9622

#### Somatic cells:

Sr% = Cv: relative standard deviation of repeatability conform IDF

