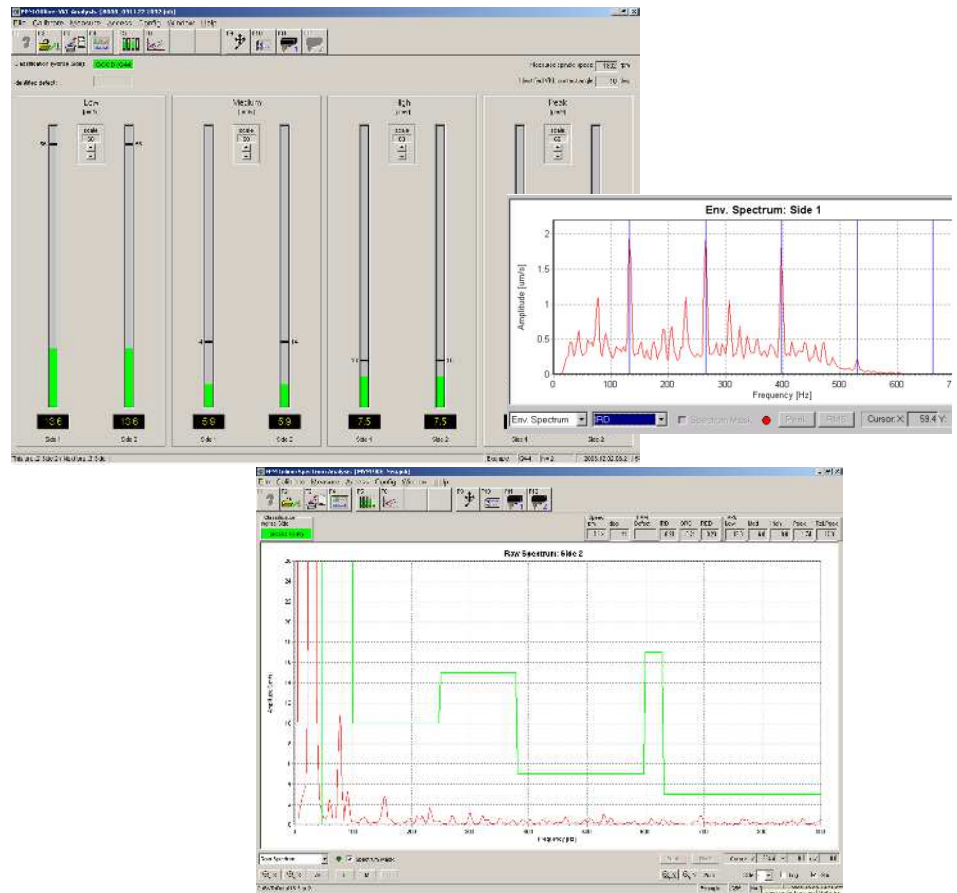


# Analysing software for roller bearing noise

FPM



## General description

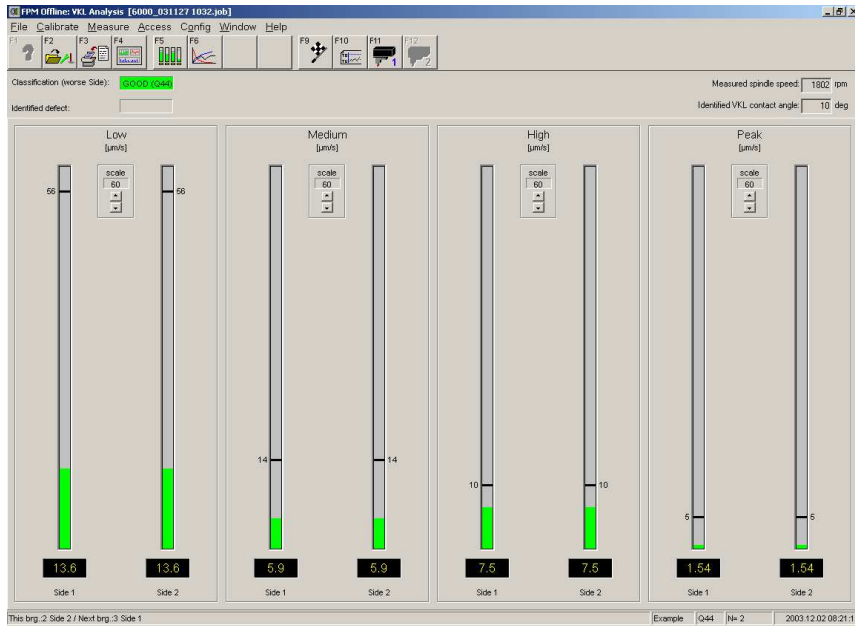
The FPM Finger Print Method is an analysing software for determining roller bearing noise and noise sources. The FPM software is designed according to Windows standards and runs on Windows platform. The software identifies the characteristic Low- (L), Medium- (M) and High-band (H) values according to the AFBMA Standard.

The result can be shown in  $\mu\text{m/s}$  and Andersons. Together with a fourth parameter,

the Peak (P) Value, the FPM software can classify bearings according to customer definable noise classes. The Peak parameter is used for the detection of local defects and dirt. Furthermore, a spectrum mask can be set and the calculated contact angle displayed.

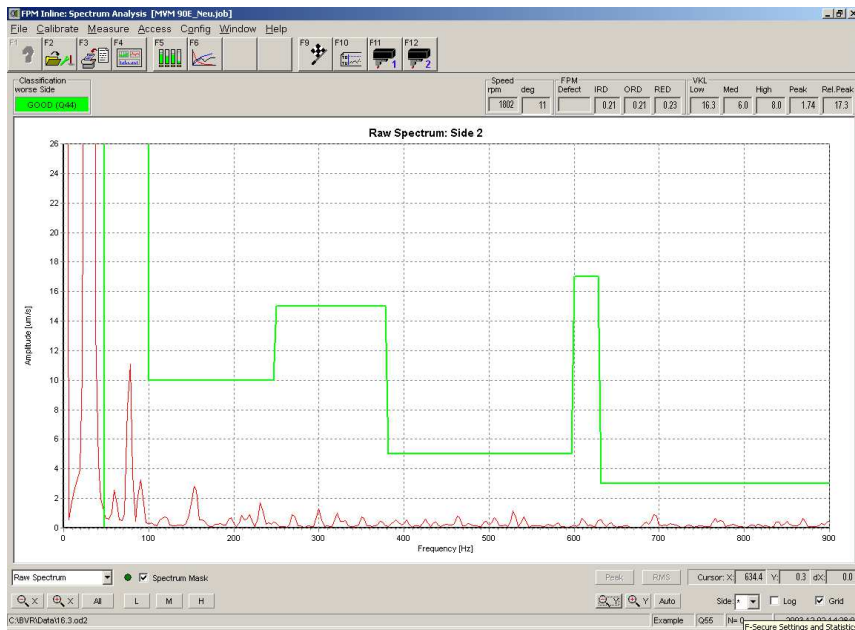


# Evaluation screens



## VKL analysis window

The most simple result screen is the 'VKL Analysis' and is restricted to measurement results which are required for the Q-classification according to the SKF standards. These are the L-band, M-band, H-band values and the P value. The results are graphically shown with bars and with digital read-outs below the bars.



## Spectrum analysis window

The 'Spectrum Analysis' window is provided for viewing at detailed results from the analysis of the bearing vibration signals. The bearing classification, as well as the numerical values of the identified VK parameters (L, M, H either in  $\mu\text{m/s}$  or in Anderon), are also shown on top of the window.

The picture shows the activated spectrum mask. In order to find bearings, which have a so called 'pure tone' defect, it is necessary to set limits for maximum acceptable amplitude for one or more narrow frequency bands, or for frequency bands that do not coincide with the standard bands.

FPM Inline-Statistics [MVM 90E\_Neu.job]

Classification according: Inverse bearing Side  
Noise target class: Q65

Overall bearing classification [%]

target class	LMHP	Spectrum mask	Overall
inside	93.1	-	92.2
outside	6.9	-	7.8

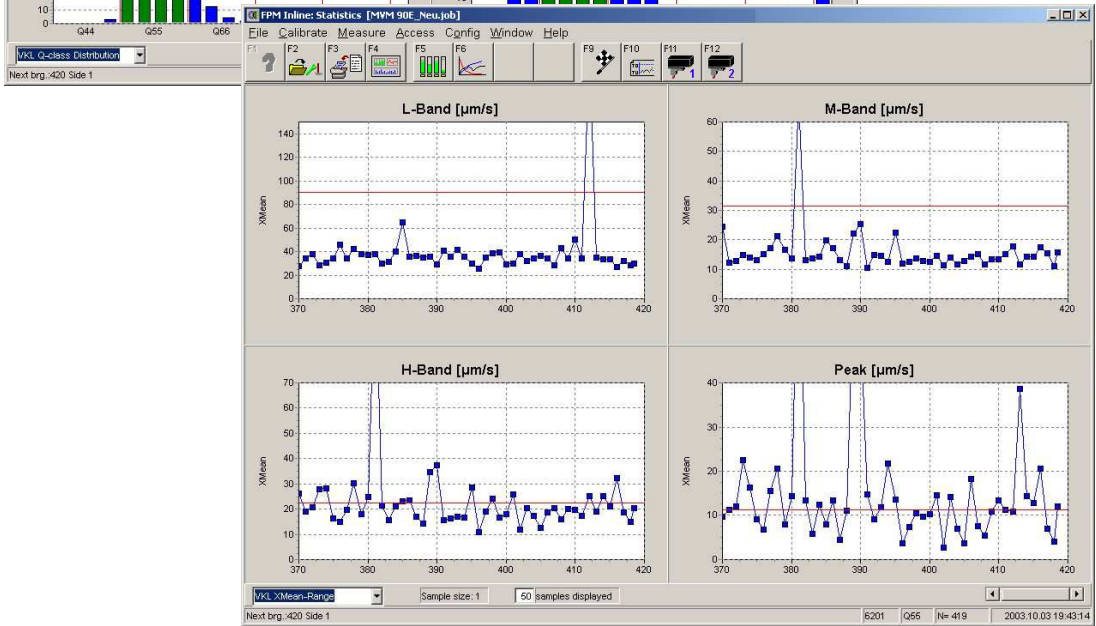
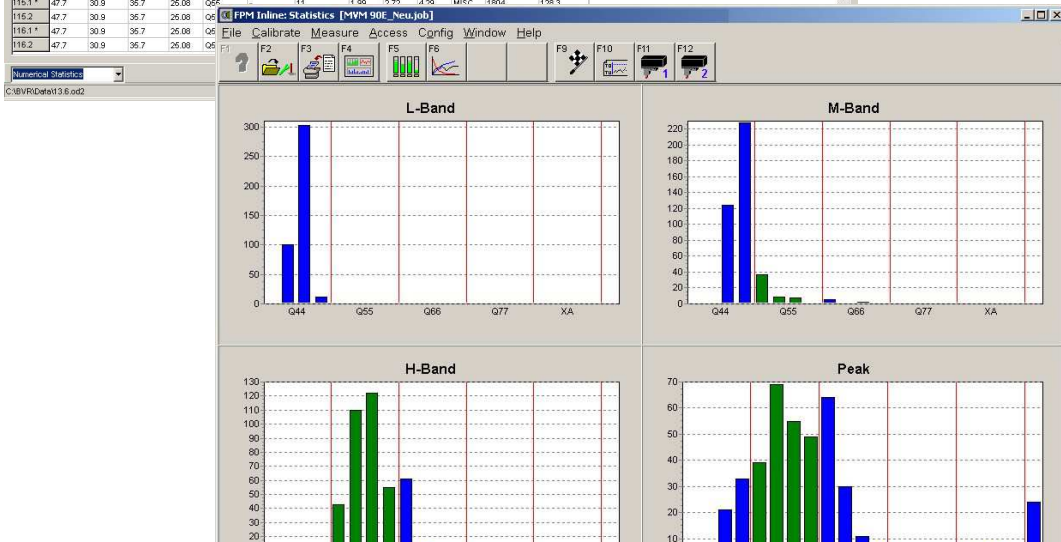
Quality class distribution [%]

Quality class	L band	M band	H band	Peak	LMHP
Q44	0.0	1.7	6.6	93.1	0.0
Q65	100.0	93.1	93.1	100.0	93.1
Q66	100.0	100.0	100.0	100.0	100.0
Q77	100.0	100.0	100.0	100.0	100.0
XA	0.0	0.0	0.0	0.0	0.0
XB	0.0	0.0	0.0	0.0	0.0

Brg. #	L band [µm/s]	M band [µm/s]	H band [µm/s]	Peak [µm/s]	Q-class	Spectrum mask	Contact angle [deg]	IRD [µm/s]	ORD [µm/s]	RED [µm/s]	Defect	Spindle speed [rpm]	Spindle speed ramp [µm/s]
Average	46.3	32.1	34.6	23.76	-	-	12	2.03	2.12	4.74	-	1805	132.9
XBar-3S	33.4	19.9	15.4	11.77	-	-	9	1.24	0.93	1.22	-	1800	83.6
XBar+3S	64.3	61.6	77.8	47.96	-	-	16	3.32	4.81	18.34	-	1810	211.6
Minimum	31.8	20.6	16.2	6.15	-	-	9	1.00	0.95	0.96	-	1804	61.7
Maximum	49.7	65.4	60.6	30.27	-	-	13	3.34	3.31	7.92	-	1815	195.4
108.1*	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
108.2	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
109.1	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
109.2*	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
110.1	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
110.2*	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
111.1	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
111.2*	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
112.1	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
112.2*	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
113.1	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
113.2*	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
114.1	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
114.2*	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
115.1*	47.7	30.9	35.7	25.08	Q65	-	11	1.99	2.72	4.29	MISC	1804	128.3
115.2	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
116.1*	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3
116.2	47.7	30.9	35.7	25.08	Q65	-	13	1.91	1.84	6.22	MISC	1804	128.3

### Statistic

Numerical and graphical display of the measuring criteria defined by the user.



## Software

Advanced users have the possibility to investigate the time signal, the enveloped time signal and the amplitude spectrum of the raw signal or enveloped signal. Setting cursors which indicate local defects, cage problems and waviness analysis are just some of the numerous features for a detailed analysis of the noise signals.

The software synchronises its defect analysis to the internal rolling speeds of the bearing, which makes the assessment of the causes of vibration very accurate. The enveloped signal is filtered and an FFT is carried out to calculate an enveloped spectrum. From the enveloped spectrum the RMS levels in narrow bands around the defect frequencies are then calculated for each component. For double row bearings, a number of special features are dedicated. Alternatively, worst or best case statistics can be selected, axial clearance can be measured, different geometries and limits for each row can be specified, and so on.

Reports can be freely configured and printed. Pure time data can be saved to files, and all results can be saved to ASCII files.

## Hardware

The FPM software is installed on the CMME 7001 electronics. The CMME 7001 is the latest generation of vibration testing electronics which can be used for in- and offline vibration measurements. The CMME 7001 is a robust industrial Mini-PC with specific hardware components.

For machine control a standard SIEMENS PLC can be connected to the CMME 7001 electronics. For more information about the hardware, please see the CMME 7001 data sheet.

## Frequency bands

1 800 r/min  
Band L: 50 ..... 300 Hz  
Band M: 300 ..... 1 800 Hz  
Band H: 1 800 ..... 10 000 Hz

700 r/min  
Band L: 20 ..... 120 Hz  
Band M: 120 ..... 700 Hz  
Band H: 700 ..... 4 000 Hz

## Signal evaluation criteria

L-, M-, H-band values; Peak values; Quality-classification; frequency spectrum mask; dirt; inner ring/outer ring and rolling elements defects

Technical specifications subject to change without notice.

For more information on your specific application, please contact our engineers at QT.

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PUB CM/P2 14878/2 EN · May 2019

