Landesumweltamt Brandenburg

Gleichwertigkeitsnachweis für die Messergebnisse der Partikelmonitore mit dem Referenzverfahren - PM10, 2012

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

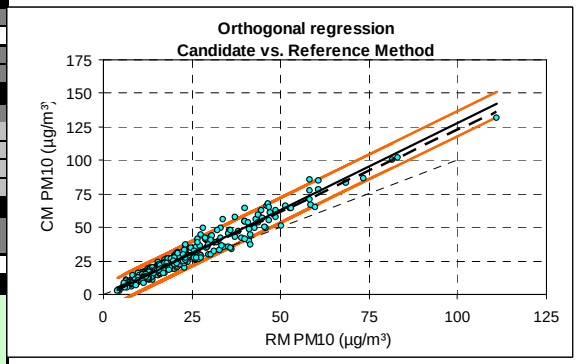
DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

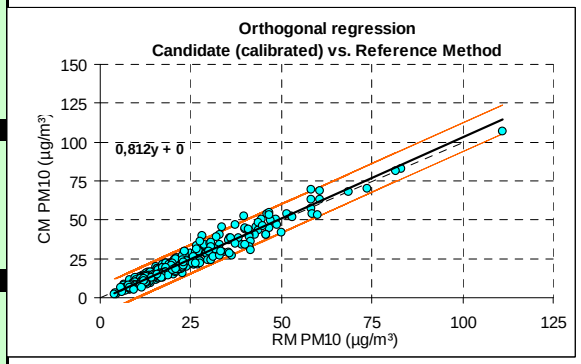
CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	OK
Comments:		

RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**0,772y + 1,533**		N (Spring)	0	n
Regression (i=0)	**0,812y**		N (Summer)	0	n
N	361	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	13	n	Outliers	9	%
Outliers	4%	%	Outliers	2%	%
Mean CM	25,7	µg/m³	Mean CM	20,9	µg/m³
Mean RM	21,4	µg/m³	Mean RM	21,4	µg/m³
Number of RM > 0.5LV	99	n	Number of CM > 0.5LV	96	n
Number of RM > LV	16	n	Number of CM > LV	21	n
REGRESSION RESULTS (RAW)			**REGRESSION RESULTS (CALIBRATED)**		
Slope b	**1,296**	**significant**	**Slope b**	1,047	**significant**
Uncertainty of b	0,015		Uncertainty of b	0,012	
Intercept a	**-1,986**	**significant**	**Intercept a**	-1,497	**significant**
Uncertainty of a	0,386		Uncertainty of a	0,313	
r^2	0,951		r^2	0,951	
Slope b forced trough origin	**1,231**	**significant**			
Uncertainty of b (forced)	0,0084				
EQUIVALENCE TEST (RAW)			**EQUIVALENCE TEST (CALIBRATED)**		
Uncertainty of calibration	0,85	µg/m³	**Calibration**	**0,812y + 0**	
Uncertainty of calibration (forced)	0,42	µg/m³	**u(calibration)**	**0,42**	µg/m³
Random term	4,02	µg/m³	Random term	3,26	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	12,79	µg/m³	Bias at LV	0,85	µg/m³
Combined uncertainty	13,41	µg/m³	Combined uncertainty	3,37	µg/m³
Expanded relative uncertainty	**53,6%**	**fail**	**Expanded relative uncertainty**	**13,5%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
90182	119067	71832	5962		0,015
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
288505	357587	236731		0,008	0,008
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
73250	78554	71832	3910		0,012

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,00838
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,25	-1	Exclude		0,000	0,812
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,42	0,000	0,812	0,67	9,17	9,22





PM10_EDM-Cottbus

Version 2.9
Author: Ruben Beijk (ruben.beijk@rivm.nl)

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	**OK**
Comments:		

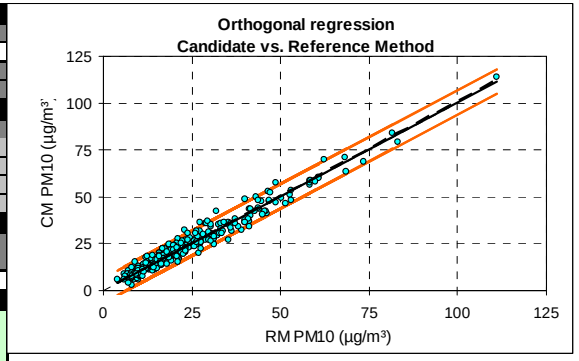
RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**0,997y + -0,169**		N (Spring)	0	n
Regression (i=0)	**0,992y**		N (Summer)	0	n
N	341	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	14	n	Outliers	12	%
Outliers	4%	%	Outliers	4%	%
Mean CM	22,7	µg/m³	Mean CM	22,5	µg/m³
Mean RM	22,5	µg/m³	Mean RM	22,5	µg/m³
Number of RM > 0.5LV	102	n	Number of CM > 0.5LV	106	n
Number of RM > LV	19	n	Number of CM > LV	19	n

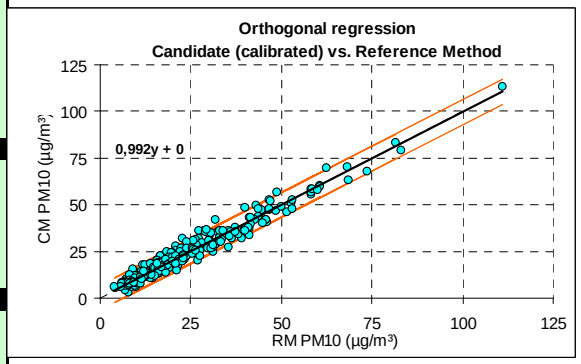
REGRESSION RESULTS (RAW)			REGRESSION RESULTS (CALIBRATED)		
Slope b	**1,003**		**Slope b**	0,995	
Uncertainty of b	0,011		Uncertainty of b	0,011	
Intercept a	**0,170**		**Intercept a**	0,172	
Uncertainty of a	0,290		Uncertainty of a	0,287	
r^2	0,961		r^2	0,961	
Slope b forced trough origin	**1,008**	**significant**			
Uncertainty of b (forced)	0,0059				

EQUIVALENCE TEST (RAW)			EQUIVALENCE TEST (CALIBRATED)		
Uncertainty of calibration	0,61	µg/m³	**Calibration**	**0,992y + 0**	
Uncertainty of calibration (forced)	0,30	µg/m³	**u(calibration)**	**0,30**	µg/m³
Random term	2,85	µg/m³	Random term	2,84	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	0,31	µg/m³	Bias at LV	-0,10	µg/m³
Combined uncertainty	2,87	µg/m³	Combined uncertainty	2,85	µg/m³
Expanded relative uncertainty	**11,5%**	***pass***	**Expanded relative uncertainty**	**11,4%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
71752	73399	73010	2912		0,011
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
246050	249486	245537		0,006	0,006
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
71178	72230	73010	2865		0,011

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,00592
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,25	-1	Exclude		0,000	0,992
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,30	0,000	0,992	0,67	6,60	6,63





PM10-Sharp Cottbus

Version 2.9
Author: Ruben Beijk (ruben.beijk@rivm.nl)

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

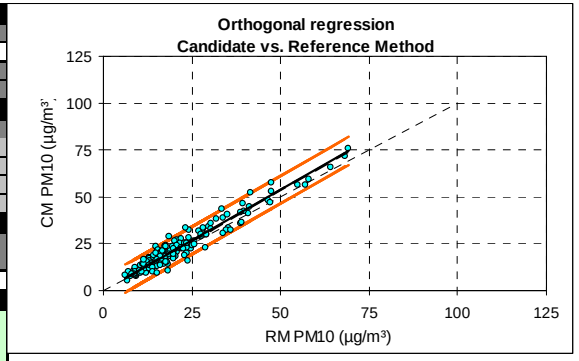
DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

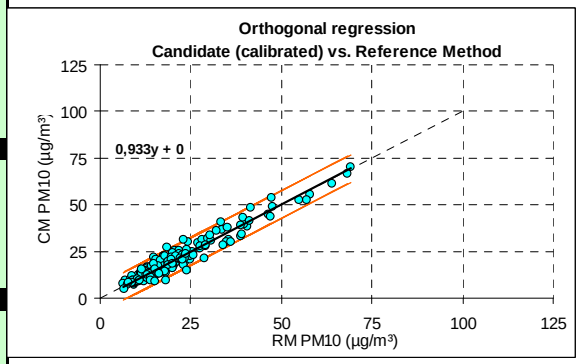
CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	OK
Comments:		

RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**0,924y + 0,277**		N (Spring)	0	n
Regression (i=0)	**0,933y**		N (Summer)	0	n
N	182	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	8	n	Outliers	4	%
Outliers	4%	%	Outliers	2%	%
Mean CM	22,4	µg/m³	Mean CM	20,9	µg/m³
Mean RM	20,9	µg/m³	Mean RM	20,9	µg/m³
Number of RM > 0.5LV	39	n	Number of CM > 0.5LV	42	n
Number of RM > LV	6	n	Number of CM > LV	7	n
REGRESSION RESULTS (RAW)			**REGRESSION RESULTS (CALIBRATED)**		
Slope b	**1,083**	significant	**Slope b**	1,008	
Uncertainty of b	0,020		Uncertainty of b	0,019	
Intercept a	**-0,300**		**Intercept a**	-0,230	
Uncertainty of a	0,491		Uncertainty of a	0,458	
r^2	0,935		r^2	0,935	
Slope b forced trough origin	**1,072**	significant			
Uncertainty of b (forced)	0,0099				
EQUIVALENCE TEST (RAW)			**EQUIVALENCE TEST (CALIBRATED)**		
Uncertainty of calibration	1,13	µg/m³	**Calibration**	**0,933y + 0**	
Uncertainty of calibration (forced)	0,50	µg/m³	**u(calibration)**	**0,50**	µg/m³
Random term	3,18	µg/m³	Random term	2,99	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	3,84	µg/m³	Bias at LV	0,16	µg/m³
Combined uncertainty	4,98	µg/m³	Combined uncertainty	3,00	µg/m³
Expanded relative uncertainty	**19,9%**	***pass***	**Expanded relative uncertainty**	**12,0%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
25802	28811	24704	1899		0,020
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
111143	119994	104578		0,010	0,010
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
24075	25083	24704	1649		0,019

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,00995
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,26	-1	Exclude		0,000	0,933
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,50	0,000	0,933	0,67	7,34	7,43





PM10-EDM-Eberswalde-Verkehr

Version 2.9
Author: Ruben Beijk (ruben.beijk@rivm.nl)

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

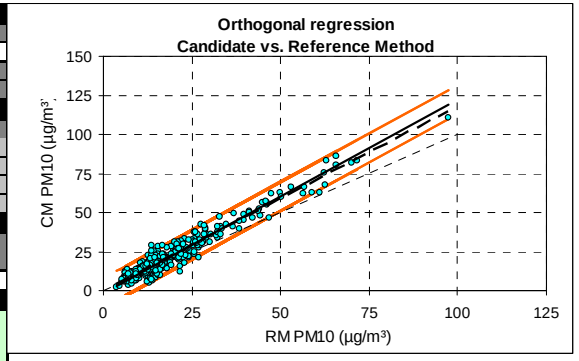
DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

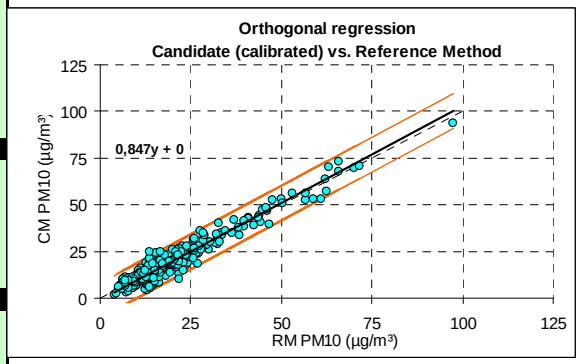
CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	OK
Comments:		

RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**0,807y + 1,349**		N (Spring)	0	n
Regression (i=0)	**0,847y**		N (Summer)	0	n
N	338	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	11	n	Outliers	2	%
Outliers	3%	%	Outliers	1%	%
Mean CM	22,7	µg/m³	Mean CM	19,3	µg/m³
Mean RM	19,7	µg/m³	Mean RM	19,7	µg/m³
Number of RM > 0.5LV	74	n	Number of CM > 0.5LV	76	n
Number of RM > LV	14	n	Number of CM > LV	16	n
REGRESSION RESULTS (RAW)			**REGRESSION RESULTS (CALIBRATED)**		
Slope b	**1,240**	**significant**	**Slope b**	1,044	**significant**
Uncertainty of b	0,017		Uncertainty of b	0,014	
Intercept a	**-1,673**	**significant**	**Intercept a**	-1,303	**significant**
Uncertainty of a	0,402		Uncertainty of a	0,341	
r^2	0,936		r^2	0,936	
Slope b forced trough origin	**1,181**	**significant**			
Uncertainty of b (forced)	0,0094				
EQUIVALENCE TEST (RAW)			**EQUIVALENCE TEST (CALIBRATED)**		
Uncertainty of calibration	0,94	µg/m³	**Calibration**	**0,847y + 0**	
Uncertainty of calibration (forced)	0,47	µg/m³	**u(calibration)**	**0,47**	µg/m³
Random term	4,07	µg/m³	Random term	3,45	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	10,32	µg/m³	Bias at LV	0,91	µg/m³
Combined uncertainty	11,09	µg/m³	Combined uncertainty	3,57	µg/m³
Expanded relative uncertainty	**44,4%**	**fail**	**Expanded relative uncertainty**	**14,3%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
68125	86718	57200	5720		0,017
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
219584	261640	188344		0,010	0,009
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
57697	62203	57200	4077		0,014

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,00942
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,25	-1	Exclude		0,000	0,847
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,47	0,000	0,847	0,67	9,29	9,35





PM10-EDM-Eisenhüttenstadt

Version 2.9
Author: Ruben Beijk (ruben.beijk@rivm.nl)

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

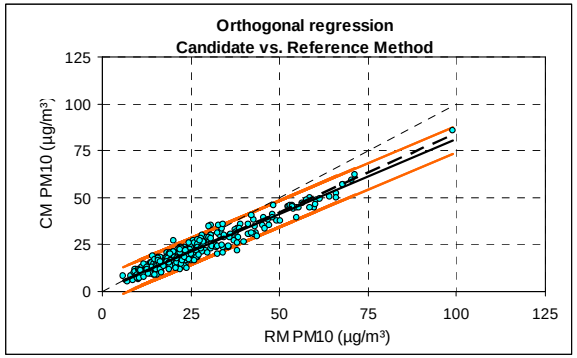
DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

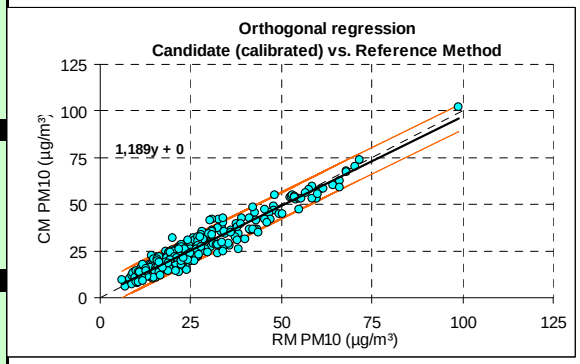
CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	OK
Comments:		

RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**1,248y + -1,603**		N (Spring)	0	n
Regression (i=0)	**1,189y**		N (Summer)	0	n
N	335	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	10	n	Outliers	18	%
Outliers	3%	%	Outliers	5%	%
Mean CM	21,9	µg/m³	Mean CM	26,0	µg/m³
Mean RM	25,7	µg/m³	Mean RM	25,7	µg/m³
Number of RM > 0.5LV	124	n	Number of CM > 0.5LV	137	n
Number of RM > LV	26	n	Number of CM > LV	25	n
REGRESSION RESULTS (RAW)			**REGRESSION RESULTS (CALIBRATED)**		
Slope b	**0,802**	**significant**	**Slope b**	0,960	**significant**
Uncertainty of b	0,012		Uncertainty of b	0,015	
Intercept a	**1,285**	**significant**	**Intercept a**	1,357	**significant**
Uncertainty of a	0,358		Uncertainty of a	0,426	
r^2	0,923		r^2	0,923	
Slope b forced trough origin	**0,841**	**significant**			
Uncertainty of b (forced)	0,0060				
EQUIVALENCE TEST (RAW)			**EQUIVALENCE TEST (CALIBRATED)**		
Uncertainty of calibration	0,71	µg/m³	**Calibration**	**1,189y + 0**	
Uncertainty of calibration (forced)	0,30	µg/m³	**u(calibration)**	**0,30**	µg/m³
Random term	3,04	µg/m³	Random term	3,66	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	-8,64	µg/m³	Bias at LV	-0,65	µg/m³
Combined uncertainty	9,16	µg/m³	Combined uncertainty	3,72	µg/m³
Expanded relative uncertainty	**36,6%**	**fail**	**Expanded relative uncertainty**	**14,9%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
48954	41202	63040	3225		0,012
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
236764	201140	283577		0,006	0,006
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
58213	58261	63040	4588		0,015

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,00605
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,25	-1	Exclude		0,000	1,189
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,30	0,000	1,189	0,67	7,01	7,04





PM10_TEOM-SES Frankfurt Verkehr

Version 2.9
Author: Ruben Beijk (ruben.beijk@rivm.nl)

GENERAL SETTINGS					
Substance	Unit	Limit value	RM uncertainty	Confidence Level	Max Uncertainty
PM10	µg/m³	50	0,67	0,975	25%
	Spring	Summer	Fall	Winter	
Starting month:	3	6	9	12	

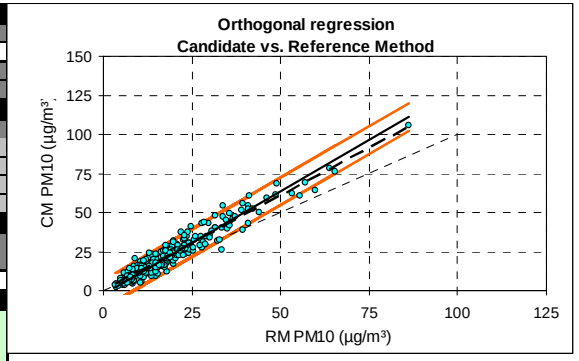
DATA SELECTION				
	Column	Value	Exclude instead of exclusive?	Status
Filter 1				*Ignore*
Filter 2				*Ignore*
Filter 3				*Ignore*
Filter 4				*Ignore*

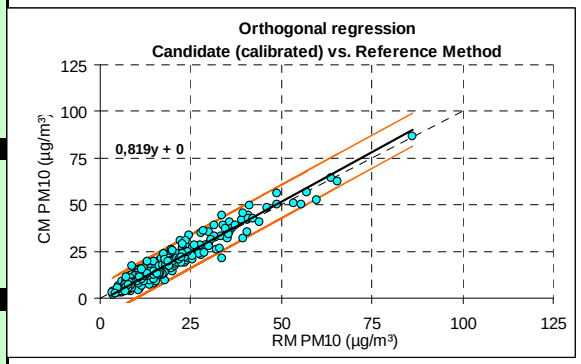
CALIBRATION SETTING		
Calibration based on:	SLOPE TROUGH ORIGIN	OK
Comments:		

RAW DATA			RESULTS AFTER CALIBRATING		
Regression	**0,76y + 1,776**		N (Spring)	0	n
Regression (i=0)	**0,819y**		N (Summer)	0	n
N	344	n	N (Fall)	0	n
			N (Winter)	0	n
Outliers	11	n	Outliers	5	%
Outliers	3%	%	Outliers	1%	%
Mean CM	20,2	µg/m³	Mean CM	16,6	µg/m³
Mean RM	17,1	µg/m³	Mean RM	17,1	µg/m³
Number of RM > 0.5LV	54	n	Number of CM > 0.5LV	60	n
Number of RM > LV	7	n	Number of CM > LV	8	n
REGRESSION RESULTS (RAW)			**REGRESSION RESULTS (CALIBRATED)**		
Slope b	**1,316**	**significant**	**Slope b**	1,070	**significant**
Uncertainty of b	0,019		Uncertainty of b	0,015	
Intercept a	**-2,337**	**significant**	**Intercept a**	-1,782	**significant**
Uncertainty of a	0,383		Uncertainty of a	0,314	
r^2	0,929		r^2	0,929	
Slope b forced trough origin	**1,220**	**significant**			
Uncertainty of b (forced)	0,0104				
EQUIVALENCE TEST (RAW)			**EQUIVALENCE TEST (CALIBRATED)**		
Uncertainty of calibration	1,01	µg/m³	**Calibration**	**0,819y + 0**	
Uncertainty of calibration (forced)	0,52	µg/m³	**u(calibration)**	**0,52**	µg/m³
Random term	3,87	µg/m³	Random term	3,18	µg/m³
Additional uncertainty (optional)	0,00	µg/m³	Additional uncertainty (optional)	0,00	µg/m³
Bias at LV	13,45	µg/m³	Bias at LV	1,74	µg/m³
Combined uncertainty	13,99	µg/m³	Combined uncertainty	3,62	µg/m³
Expanded relative uncertainty	**56,0%**	**fail**	**Expanded relative uncertainty**	**14,5%**	***pass***
Ref sampler uncertainty	0,67	µg/m³	Ref sampler uncertainty	0,67	µg/m³
Limit value	50	µg/m³	Limit value	50	µg/m³

STATISTICAL INFORMATION					
Raw data, free intercept					
dxdy	dyy	dxx	rss		u(b)
53428	72226	42539	5272		0,019
Raw data, slope forced trough origin					
Sxy	Syy	Sxx		u(b)[MaxLike] i=0	u(b_forced)
172605	212778	143592		0,010	0,010
Calibrated, free intercept					
dxdy	dyy	dxx	rss		u(b)
43783	48502	42539	3511		0,015

BACKGROUND AUTOMATION					
Chart descriptions		*Confi.Lvl List*	*Calibration List*	*Stdev of all calibrations in use*	
Description x-axis	RM PM10 (µg/m	97,5%	Free regression Trough origin	0	0,01037
Description y-axis	CM PM10 (µg/m	97,5%			
Confi.Lvl	*Calibration Type*	*Filter List*		*Calib. In use (a)*	*Calib. In use (b)*
2,25	-1	Exclude		0,000	0,819
Calibration uncertainty	*Calibration_a*	*Calibration_b*	*u(bs_reference)*	*CI Regression*	*CI Calibrated*
0,52	0,000	0,819	0,67	8,84	8,92





PM10 EDM-Hasenholz

Version 2.9
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