Application Note EDXRF1203

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EDXRF1203 - Penta Wood Treatment

Scope

This application note demonstrates the measurement of pentachlorophenol (Penta) in treated wood and wood treatment solutions using NEX QC.

Background

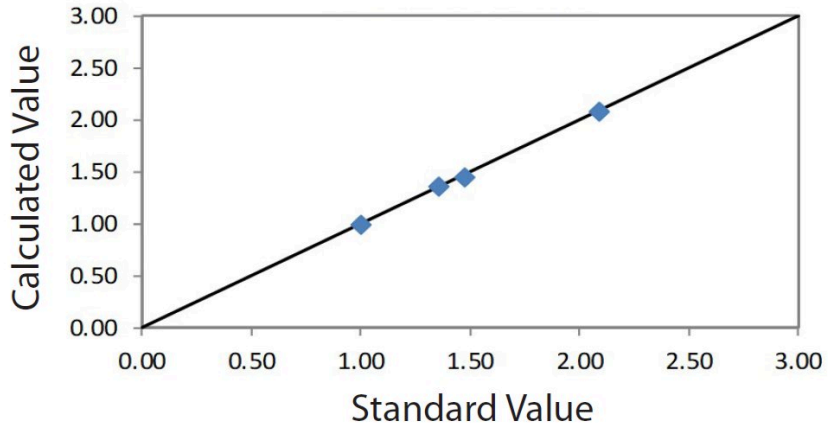
Wood treatments are used to protect lumber from fungi, insects, UV damage, water damage, and general wear. Pentachlorophenol (called Penta or PCP) is typically not used to treat wood used for residential application. It is used for heavier more industrial applications like treating telephone poles or materials for bridges. When treating wood, the proper balance of treatment solution must be monitored to ensure the highest quality while minimizing waste and excess cost due to treatment usage or product rejection. Penta levels are monitored in solution prior to treatment, and then in the wood to ensure proper retention. A quick, simple, reliable means of analysis is required throughout the quality control process. XRF is an ideal tool for such analysis.

Calibration – Penta in wood

An empirical calibration was built using a set of assayed wood standards.

Penta **Units: %**		
Sample I.D.	**Standard value**	**Calculated value**
W-A	0.998	0.991

W-B	1.350	1.369
W-C	1.470	1.457
W-D	2.090	2.090



Correlation plot Penta in wood

Repeatability – Penta in wood

To demonstrate repeatability (precision), the low and high samples were chosen from the set of calibration standards. Each sample was measured in static position.

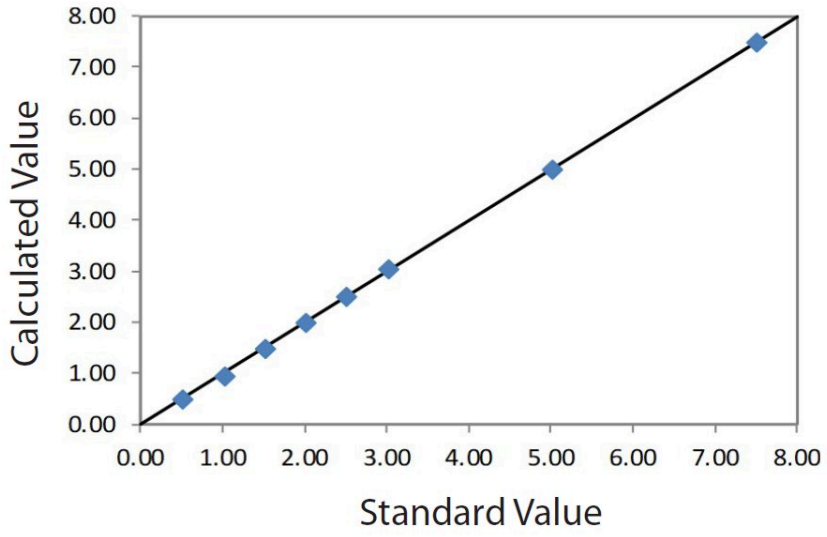
Penta **Units: %**				
Sample I.D.	**Standard value**	**Average value**	**Std. dev**	**% Relative**
W-A	0.998	0.994	0.004	0.4
W-D	2.090	2.094	0.006	0.3

Calibration – Penta in solution

An empirical calibration was built using a set of assayed solution standards.

Penta **Units: %**		
Sample I.D.	**Standard value**	**Calculated value**
S-A	0.505	0.509
S-B	1.019	0.962
S-C	1.510	1.503

S-D	1.998	2.008
S-E	2.504	2.510
S-F	3.009	3.038
S-G	5.007	4.996
S-H	7.506	7.505



Correlation plot Penta in solution

Repeatability – Penta in solution

To demonstrate repeatability (precision), the low and high samples were chosen from the set of calibration standards. Each sample was measured in static position.

Penta **Units: %**				
Sample I.D.	**Standard value**	**Average value**	**Std. dev**	**% Relative**
S-A	0.505	0.509	0.003	0.6
S-H	7.506	7.500	0.020	0.3

Conclusion

The typical results detailed here show exceptional performance for the fast and simple measurement of Penta in wood and solution. The Rigaku NEX QC is an excellent tool along the QC process in producing treated lumber, giving the production process an affordable means of optimizing quality while minimizing costs and helping to minimize product rejection and waste.

Related products

NEX QC Series

Combines quality, affordability, and performance for a wide range of applications