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Subject: Equivalency of CA-C and ACQ

Dear Roger:

I understand that you have shipped CA-C treated Douglas fir to Tahiti for a Polynesian government project and that the acceptability of CA-C has been questioned as they are more familiar with ACQ. The comparison between CA-C and ACQ can be made on several different ways. (1) on the basis of equivalent listings in the American Wood Protection Association Standards which are referenced by codes in the US and many other countries; (2) on the basis of the similar composition (copper plus co-biocides) of the preservatives, (3) on comparative long term test data and (4) on the use of both products for similar applications around the world.

In the American Wood Protection Association Standard U1, USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD, both ACQ and CA-C are listed for treated of Douglas fir for Use Categories. As shown below for Douglas fir treatment in above ground applications the equivalent retentions are 0.15 pcf for ACQ and 0.06 pcf for CA-C. The comparable retentions for ground contact use are 0.40 pcf for ACQ and 0.15 pcf for CA-C.

3.0 Sawn Products – UC3B

Use Category 3B (Above ground, exterior, exposed or poor water run-off)

Preservative retentions pcf (as active ingredients unless otherwise specified)

pcf (English units)	Pines				Spruce		Coastal Douglas-fir ^(a)	Hem-fir	Hem-fir North Eastern Hemlock Subalpine Fir	Western Redcedar Alaska Yellow Cedar Incense Cedar Redwood	White Oak	Red Oak ^(b)		Maple	Black & Red Gum
	Southern Mixed Southern Radiata, Patula Caribbean	Ponderosa Red Eastern White	Scots Pine-Ger Scots Pine-Swe	Jack Lodgepole	Western White Engelmann Sitka Spruce	Spruce-Pine-Fir West						U ₁ ^(c)	U ₂ ^(c)		
CR (as solution)	8.0	8.0	#	8.0	8.0	#	8.0	8.0	8.0	8.0	R	6.0	5.0	10.0	6.0
CR-S (as solution)	8.0	8.0	#	8.0	8.0	#	8.0	8.0	8.0	8.0	R	6.0	5.0	#	6.0
CR-PS (as solution)	8.0	8.0	#	8.0	8.0	#	8.0	8.0	8.0	8.0	R	6.0	5.0	#	6.0
Cu8	0.020	0.020	#	#	#	#	#	0.020	0.020	0.020	#	#	#	#	#
CuN (as Cu metal) ^(c)	0.040	0.040	#	#	0.040	#	0.040	0.040	0.040	0.040	#	#	#	#	#
PCP-A	0.40	0.40	#	0.40	0.40	#	0.40	0.40	0.40	0.40	R	0.30	0.25	#	0.30
PCP-C	0.40	0.40	#	0.40	0.40	#	0.40	0.40	0.40	0.40	R	0.30	0.25	#	0.30
ACC ^(c)	0.25	0.25	0.25	0.25	0.25	#	0.25	0.25	0.25	0.25	0.25	0.25	0.25	#	0.25
ACQ-A ^(c)	0.15	0.15	0.15	0.15	#	#	0.15	0.15	#	#	#	#	#	#	#
ACQ-B ^(c)	0.25	0.25	#	#	0.25	#	0.25	0.25	0.25	0.25	#	#	#	#	#
ACQ-C ^(c)	0.25	0.25	#	0.25	#	0.25	0.25	0.25	#	#	#	#	#	#	#
ACQ-D ^(c)	0.15	0.15	0.15	0.15	#	#	0.15	0.15	#	#	#	#	#	#	#
ACZA ^(c)	0.25	0.25	#	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	#	0.25
CA-B ^(c)	0.10	0.10	0.10	#	#	#	0.10	0.10	#	#	#	#	#	#	#
CA-C ^(c)	0.060	0.060	0.060	#	#	#	0.060	0.060	#	#	#	#	#	#	#

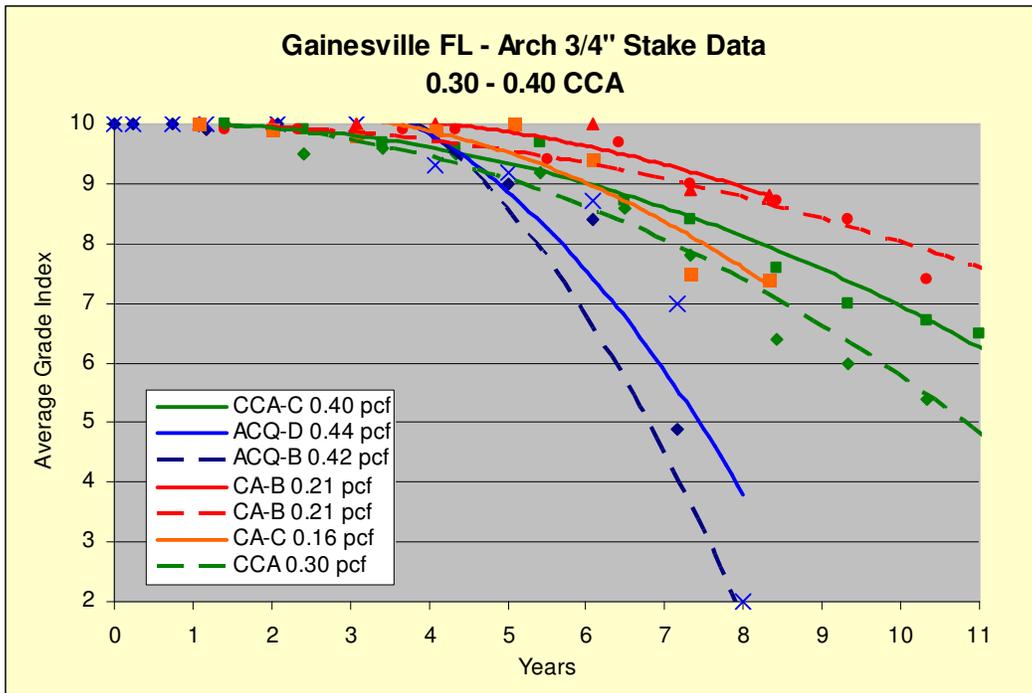
While these preservatives are listed at substantially different retentions, an examination of the composition points out the similarity. Both preservatives use copper as the primary biocide; ACQ uses one of several quaternary compounds (usually didecyl-dimethyl-ammonium chloride or carbonate) while CA-C uses a 1:1 ration of tebuconazole and propiconazole. ACQ is approved with either a 1:1 or 2:1 ratio of copper oxide:DDAC. Copper azole has a 25:1 ratio of copper:azoles; the azoles are a 1:1 ratio of teb:prop.

When broken down to an equivalent copper metal basis the copper content of the preservatives is very similar. The azole retentions are substantially less than the DDAC retentions as they are much more effective compounds in preventing decay at lower retentions.

End Use	Preservative	Retention Comparisons (pcf)				
		Total	Copper Oxide	Copper (metal)	DDAC	Azoles Teb+Prop
UC3B Above Ground	ACQ-A	0.15	0.075	0.060	0.075	
	ACQ-D	0.15	0.100	0.080	0.050	
	CA-C	0.06		0.058		0.002
UC4A Ground Contact	ACQ-A	0.40	0.200	0.160	0.200	
	ACQ-D	0.40	0.267	0.213	0.133	
	CA-C	0.15		0.145		0.005

Long term testing that Lonza was presented to AWPA in 2008 to gain approval of CA-C. These tests have demonstrated the effectiveness of CA-C at these retentions; the results have been similar to CCA and often superior to ACQ. One of the charts from the data package illustrates the performance of CA-C in Gainesville, FL which has both severe decay and termite hazard:

Copper azole preservatives have been sold by Lonza Wood Protection and our predecessor companies,



Arch Wood Protection and Hickson Corporation around the world since the late 1980's. While in the Americas copper azole treated wood is sold under the Wolmanized® Outdoor® Wood trademark, in France, Europe and much of the rest of the world they are sold under the Tanalized® Wood trademark.

The following summary of copper azole retentions around the world was submitted as part of our data package in 2008 to AWPA:

Global Listed Retentions

Copper azole is used worldwide and almost all of the copper azole retention listings are much lower in other countries than in the U.S. Our AWPA proposals for CA-C at 0.06 pcf for UC3B and 0.15 pcf for UC4A are in line with retentions that are listed and have been in use for many years in other countries around the world.

Table 1 gives specified retentions for copper azole from seven different countries. Five of these countries have listings for CA-C. For UC3B, the CA-C listed copper retentions for CA-C range from 0.05 to 0.094 pcf with an average of 0.065 pcf. For UC4A, ground contact, the CA-C listed copper retentions range from 0.068 to 0.15 pcf with an average of 0.10 pcf. The CA-C averages of 0.065 pcf and 0.10 pcf correspond well to our proposals of 0.06 and 0.15 pcf for UC3B and UC4A, respectively.

In fact, the highest listing for CA-C is from France where the CTBA has a HC 4 (SP) for critical round wood in ground contact. Approvals for both CBA-A and CA-C are 0.156 pcf copper. This is essentially the same as the proposed 0.15 pcf for ground contact use in the U.S.

Table 1. Representative Copper Azole Retention Values

Country	Preservative	Above Ground UC3B Copper Retention (pcf)	Ground Contact UC4A Copper Retention (pcf)
Australia*	CBA-A	0.073	0.132
Belgium*	CBA-A	0.093	0.124
	CA-C	0.050	0.091
France*	CBA-A	0.093	0.093
	CA-C	0.072	0.093
Germany**	CBA-A	0.093	0.093
	CA-C	0.053	0.068
Holland*	CA-B	0.060	0.120
Portugal*	CA-C	0.093	0.150
Nordic Countries*	CA-C	0.056	0.113

*Retentions are based on analysis of sapwood

** Retentions are by gauge on commodities <4 in.

I trust that this summary will provide the information needed to gain approval for sale of CA-C treated products in Polynesia. I will be glad to provide the full data package presented to AWPA if they would like to review it.

Very truly yours,



Steve Shields