

12.19 1/95

To: Mike Chee
From: Zack Jacobs

The following comments resulted from our conversation this morning:

None of NASSCOs welding rods are calculated using the Districts "Other" Emission Category . NASSCO reports all welding as either SMAW or GMAW.

District Factors:

	GMAW	SMAW	OTHER
Fume Rate (lb fume/lb rod)	0.01 ✓	0.02 ✓	0.05
* Fume Composition	same as rod (100%)	same as rod (100%)	same as rod (100%)
CR+6/Cr in fume	5.0%	63%	0.10

ARB/EF
ARB/EF

Dr. Bell (NASSCO) Factors:

	GMAW	SMAW	OTHER
Fume Rate (lb fume/lb rod)	0.00413	0.00626	na
* Fume Composition	54.64%	28.65%	na
** CR+6/Cr in fume	6.84%	70.85%	na

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* The rod composition is not the same as the fume composition. For example a GMAW welding rod (18% Cr.) will display closer to 6% chrome in the fume. This is accounted for in NASSCOs emission factors.

** NASSCO welding emission factors account for a higher percentage of chrome in fume in the hexavalent state. Therefore, the District and NASSCO somewhat agree on how much chrome is in the hexavalent state.

Another problem that I have encountered is that the numbers represented in the second AB-2588 submittal is not entirely consistent with the latest. 1989 data is supplied as a additional fax.

TABLE B-2

ESTIMATION OF EMISSION PARAMETERS FOR SMAW WELDING OPERATIONS

Source	Rod Type	% Cr in Rod	% Rod to Fume	% Cr in Fume	% Cr6 in Fume	% Fume to Rod Cr	% Fume Cr6/Cr
AWS (1979) 1, 2	E316-16	18.7	0.71	5.80	3.949	31.02	68.08
AWS (1979) 1, 3	E316-16	18.7	0.60	6.50	3.949	34.76	60.75
AWS (1979) 1, 4	Hay 25	20.0	0.65	6.90	3.949	34.50	57.23
AWS (1979) 1, 4	Inc 625	21.5	0.70	5.90	3.949	27.44	66.93
AWS (unp) d	308L-16	19.0	0.40	5.606	4.50	29.51	80.27
AWS (unp) e	293	23.5	0.50	5.606	3.80	23.86	67.78
AWS (unp) f	316L-16	18.5	0.70	5.606	4.70	30.30	83.84
AWS (unp) g	331	19.5	0.75	5.606	5.10	28.75	90.97
Muttl (1979)	**	20.3	0.626	2.99	2.01	14.73	67.22
Stern (1979)	**	19.642	0.626	6.00	4.50	30.55	75.00
Stern (1981)	**	19.642	0.626	6.40	4.30	32.58	67.19
Tola (1977)	**	18.0	0.626	3.57	2.68	19.83	75.07
Weeks (undated)	**	18.0	0.626	6.00	3.949	33.33	65.81
Weeks (undated)	**	20.0	0.626	6.00	3.949	30.00	65.81
Averages of all data =====>		19.642	0.626	5.606	3.949	28.65	70.85
STD of all data =====>		1.53	0.11	1.21	1.00	5.47	8.84
Percent STD of all data ===>		7.77	17.99	21.61	25.34	19.10	12.48
Averages of AWS data =====>		19.925	0.626	6.275	4.525	30.02	71.98
STD of AWS data =====>		1.63	0.11	0.45	0.47	3.36	11.02
Percent STD of AWS data ===>		8.20	17.99	7.16	10.41	11.18	15.31

AWS (1979)
 Fumes and Gases in the Welding Environment
 1 Chromium content from Table 2.18
 2 Percent electrode to fume from Table B7
 3 Percent electrode to fume from Table B8
 4 Percent electrode to fume from Table B10

AWS (unp) See NASSCO WELD_2.WK1
 Data from an unpublished AWS report
 d Nassco Id No.1504
 e Nassco Id No. 1506
 f Nassco Id No. 1506
 g Nassco Id No. 1507

fume Cr as a % of rod Cr

TABLE B-3

ESTIMATION OF EMISSION PARAMETERS FOR ^{GMAW} GAS-SHIELDED WELDING OPERATIONS

Source	Rod Type	% Cr in Rod	% Rod to Fume	% Cr in Fume	% Cr6 in Fume	% Fume to Rod Cr	% Fume Cr6/Cr
AWS (1979) 1, 5	E316LT-3	18.7	0.84	12.5	0.620	66.84	4.96
AWS (1979) 1, 6	Inc 625	21.5	0.08	15.4	0.620	71.63	4.03
AWS (1979) 1, 6	Hay 25	20.0	0.13	14.9	0.620	74.50	4.16
AWS (1979) 1, 6	Hay C276	16.0	0.69	8.2	0.620	51.25	7.56
AWS (unp) a	308L	20.8	0.35	10.736	0.70	51.61	6.52
AWS (unp) b	309L	24.0	0.47	10.736	0.80	44.73	7.45
AWS (unp) c	316(L)	19.0	0.33	10.736	0.70	56.50	6.52
Muttl (1979)	**	20.1	0.413	6.45	0.58	32.09	8.99
Thompson (1979)	**	19.375	0.413	13.8	0.32	71.23	2.32
Weeks (undated)	**	15.0	0.413	3.9	0.620	26.00	15.90
Averages of all data =====>		19.375	0.413	10.736	0.620	54.64	6.84
STD of all data =====>		2.73	0.26	4.19	0.17	15.99	3.56
Percent STD of all data =====>		14.07	62.37	39.07	26.68	29.27	52.06
Averages of AWS data =====>		20.000	0.413	12.750	0.733	59.58	5.89
STD of AWS data =====>		2.32	0.26	2.85	0.05	10.58	1.38
Percent STD of AWS data =====>		11.59	62.37	22.33	6.43	17.75	23.47

AWS (1979)
Fumes and Gases in the Welding Environment
1 Chromium content from Table 2.18
5 Percent electrode to fume from Table B15
6 Percent electrode to fume from Table B21

AWS (unp) See NASSCO WELD_2.WK1
Data from an unpublished AWS report
a Nassco Id No. 1500, 1501, 1502
b Nassco Id No. 1517
c Nassco Id No. 1501, 1510