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LIFE OF NON-FERROUS SCREEN WIRE CLOTH

This is a brief digest of Research Paper RP803, (June 1935) "Atmospheric Exposure Tests on Non-Ferrous Screen Wire Cloth", by G. Willard Quick,¹ covering tests conducted by the National Bureau of Standards in cooperation with the American Society for Testing Materials.

The data presented cover atmospheric-exposure tests on non-ferrous screen wire cloth of seven different materials mounted in three types of frames--copper 30" x 36", wood 30" x 36", wood 12" x 12"--exposed for a period of approximately nine years (November 1925 to January 1935) to atmospheric conditions representing heavy industrial contamination, temperate seacoast with some industrial contamination, tropical seacoast with some industrial contamination, and normal inland, at the locations indicated in the table shown on page 2.

Laboratory accelerated-corrosion tests, consisting of exposure of material to salt spray, and intermittent immersion in salt solutions and in dilute sulphuric acid, were also conducted to determine whether or not such tests could be used as a means or determining the expected life of the material in actual service. As the results of these accelerated-corrosion tests were not consistent with the results of the atmospheric-exposure tests at any of the locations, they could not be used to predict the behavior of the material in service and for that reason are not included here.

In both series of tests, specimens were judged by appearance and tensile strength.

A summary of results of the atmospheric corrosion tests appears on the following page.

¹Available from Superintendent of Documents, Government Printing Office, Washington, D. C. (Price 10¢)

CONDITION OF NON-FERROUS SCREEN WIRE CLOTH AND LOSS IN TENSILE STRENGTH
AFTER EXPOSURE TO VARIOUS ATMOSPHERIC CONDITIONS
(16-MESH INSECT SCREEN CLOTH WOVEN FROM 0.0113" DIAMETER WIRE)

ALLOY NO.	NOMINAL COMPOSITION PERCENT	R		E		S		U		L		T		S	
		TIME	PERCENTAGE LOSS IN TENSILE STRENGTH**	CONDITION**	TIME	PERCENTAGE LOSS IN TENSILE STRENGTH**	CONDITION**	TIME	PERCENTAGE LOSS IN TENSILE STRENGTH**	CONDITION**	TIME	PERCENTAGE LOSS IN TENSILE STRENGTH**	CONDITION**	TIME	PERCENTAGE LOSS IN TENSILE STRENGTH**
				ATMOSPHERE WITH HEAVY-INDUSTRIAL CONTAMINATION (PITTSBURGH, PA.)			TEMPERATE SEACOAST ATMOSPHERE WITH SOME INDUSTRIAL CONTAMINATION (PORTSMOUTH, VA.)			TROPICAL SEACOAST ATMOSPHERE WITH SOME INDUSTRIAL CONTAMINATION (CRISTOBAL, C.Z.)					NORMAL INLAND ATMOSPHERE (WASHINGTON, D.C.)
5	COPPER UNALLOYED	7 YR 6 MO	51	FAILURE	8 YR 6 MO	NO FAILURE	29	NO FAILURE	9 YR 2 MO	NO FAILURE	34	NO FAILURE	9 YR 2 MO	NO FAILURE	21
6	COPPER TIN 2	7 YR 6 MO	47	FAILURE	8 YR 6 MO	NO FAILURE	29	NO FAILURE	9 YR 2 MO	NO FAILURE	32	NO FAILURE	9 YR 2 MO	NO FAILURE	13
7	COPPER ALUMINUM 5	4 YR 10 MO	100	FAILURE	8 YR 6 MO	NO FAILURE	54	NO FAILURE	9 YR 2 MO	NO FAILURE	48	NO FAILURE	9 YR 2 MO	NO FAILURE	22
1	COPPER ZINC 10	7 YR 6 MO	75	FAILURE	8 YR 6 MO	NO FAILURE	37	NO FAILURE	9 YR 2 MO	NO FAILURE	39	NO FAILURE	9 YR 2 MO	NO FAILURE	15
2	COPPER ZINC 20	6 YR 4 MO	100	FAILURE	4 YR	FAILURE	100	FAILURE	4 YR 6 MO	FAILURE	100	FAILURE	9 YR 2 MO	NO FAILURE	33
3	COPPER NICKEL 20 ZINC 5	6 YR 11 MO	92	FAILURE	8 YR 6 MO	NO FAILURE	47	NO FAILURE	9 YR 2 MO	NO FAILURE	47	NO FAILURE	9 YR 2 MO	NO FAILURE	20
4	COPPER NICKEL 70	4 YR 6 MO	100	FAILURE	8 YR 6 MO	NO FAILURE	59	NO FAILURE	9 YR 2 MO	NO FAILURE	59	NO FAILURE	9 YR 2 MO	NO FAILURE	43

* NOS. 1, 4, 5, AND 6 ARE FOUR OF THE SIX TYPES OF NON-FERROUS SCREEN WIRE CLOTH RECOGNIZED IN FEDERAL SPECIFICATION RR-C-451A; PAGES 1-4 GATED ON NOVEMBER 6, 1934. THIS SPECIFICATION ALSO RECOGNIZES TWO ADDITIONAL NON-FERROUS AND THREE FERROUS TYPES AS FOLLOWS: ALUMINUM ALLOY, NICKEL-CHROMIUM-MANGANESE ALLOY, IRON OR STEEL-ZINC COATED CORROSION-RESISTING STEEL, IRON OR STEEL—PAINTED OR JAPANESE. DATA UPON WHICH TO BASE A WORTHWHILE ESTIMATE OF THE PROBABLE SERVICE LIFE OF THE LAST MENTIONED FIVE TYPES ARE NOT AVAILABLE.

** CONDITION: FAILURE IN EXPOSED SCREEN CLOTH OCCURRED WHEN THERE WAS A BREAK IN WIRE FROM CORROSION IN AT LEAST ONE PLACE.

*** TENSILE STRENGTH TESTS: AT CONCLUSION OF ATMOSPHERIC-EXPOSURE TESTS, SPECIMENS WERE CLIPPED FROM EXTRA MATERIALS EXPOSED FOR THIS PURPOSE AT WASHINGTON, D. C.; AND FROM FRAMES AT PITTSBURGH, PA.; PORTSMOUTH, VA.; AND CRISTOBAL, C. Z., TO ASCERTAIN LOSS IN STRENGTH PARALLEL TO (LONGITUDINAL) AND PERPENDICULAR TO (TRANSVERSE) DIRECTION OF WEAVE OF CLOTH. MATERIALS NO. 2, 4, AND 7 AT PITTSBURGH, PA.; NO. 2 AT PORTSMOUTH, VA. AND CRISTOBAL, C. Z. WERE EITHER ENTIRELY GONE OR SO BADLY CORRODED THAT STRENGTH COULD NOT BE MEASURED. WHERE MATERIALS FAILED AND LOSS IN STRENGTH OF LESS THAN 100% ARE INDICATED, IT SHOULD BE NOTED THAT FAILURE OCCURRED WHEN THERE WAS A BREAK IN WIRE FROM CORROSION IN AT LEAST ONE PLACE, YET MATERIAL SHOWED VARYING DEGREES OF STRENGTH.