

NAUTICAL CHART PAPER

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The production of nautical charts requires paper which meets successfully the diverse and strenuous uses to which a chart is subjected. Such factors as repeated folding, wetting, plotting of courses, scaling of distances, erasing and correcting must govern the quality of paper selected.

At one period in the history of the United States Coast and Geodetic Survey all charts were printed from engraved copper plates. In this method of printing, the strongest type of paper was desired because it was necessary to dampen the paper before printing and subject it to 600 tons of pressure after drying to reduce the wave and curl developed. Specifications for this paper required 100% rag content, substance (weight) 96 pounds, at size 17" × 22" and .007" thickness.

Later, some charts were printed lithographically from stone, although the use of the engraved copper plates also continued in press work. With the advent of metal printing, there was initiated the reproduction of nautical charts from metal printing plates by the lithographic offset press method.

Lithography introduced the use of colors in chart printing and produced the problem of color registration, which in turn greatly influenced paper specifications and manufacture. Even after the further improvement of lithography and offset printing, whereby all charts are reproduced from metal printing plates, the 100% rag content paper, at 96 substance, was used exclusively for chart production. This continued until early in World War II when, through necessity, samples of chart paper with 50% rag content, substance 72, and .0054 inch thickness were tested and found to be not only satisfactory but economical for nautical charts.

Folding endurance, strength to withstand wetting, erasing qualities to permit hand correcting, sufficient weight to permit easy filing in chart cases and cabinets, etc., and a specified moisture content of 6%, or to equal a humidity controlled at 50%, to insure close registration, are the present requirements. A fine quality 50% rag paper meeting these requirements was obtained.

Detailed specifications for the paper used in the printing of the nautical chart by the United States Coast and Geodetic Survey are as follows :

SPECIFICATIONS

Stock : Not less than 50 % cotton or linen fibre; the remainder free from unbleaches or ground wood pulp.

Acidity : pH value not less than 5.0.

Sizing : To be internally and externally sized to produce printing and erasing qualities equal to the printed standard submitted with the request. The sizing must contain no material which will cause the paper to stick to the blanket of the offset press. Rosin content is not to exceed 2%.

Weight : 17" × 22", 1,000 sheets = 72 pounds.

Folding endurance : Average, each direction, not less than 1,500 double folds.

Bursting strength : Average, not less than 65 points.

Thickness : Average, .0054 inch.

Erasing quality : Must permit redrawing with India Ink, without a tendency to feather, after a double erasure with an electric erasing machine.

Surface and finish : The surface must be smooth but not glossy and be suitable for printing nautical charts from aluminium or zinc plates by the offset process.

Expansivity : The per cent lineal change for a relative humidity variation of

15 per cent (between 65 % and 50 %) shall be not more than 0.20% across the grain and 0.07 % along the grain.

Finish (Smoothness) : Average not less than 80 seconds.

Moisture resistance : The paper must lie flat under all conditions.

Color, finish and general appearance : Must conform to the standard sample.

Sorting : The paper must be closely sorted so as to insure absence of specks, size spots, lumps, or particles that may injure the printing plates.

Grain : To run lengthwise of the sheet.

