Institute of Paper Science and Technology

PHYSICAL PROPERTIES OF LIBRARY BOOKS

Untreated Control Books

Report To

THE LIBRARY OF CONGRESS
CONTRACTS & LOGISTICS SERVICES
1701 Brightseat Road
Landover, Maryland 20785

in response to

SOLICITATION NO. RFP90-32

June 10, 1991

Project 3717

Report 4

Atlanta, Georgia

PHYSICAL PROPERTIES OF LIBRARY BOOKS

Untreated Control Books

Report To

THE LIBRARY OF CONGRESS
CONTRACTS & LOGISTICS SERVICES
1701 Brightseat Road
Landover, Maryland 20785

in response to

SOLICITATION NO. RFP90-32

June 10, 1991

Project 3717

Report 4

Table of Contents

SUMMARY 1

BACKGROUND 2

DEMONSTRATION SETS 4

COMPOSITION OF TEST BOOKS 6

IDENTIFICATION OF ITEMS IN DEMONSTRATION SETS 8

RECEIPT AND STORAGE OF BOOK SHIPMENTS 10

TESTING PROCEDURES 12

- MOISTURE CONTENT 15
- ODOR EVALUATION 18
- TEMPERATURE EXPOSURE 20
- EVALUATION OF FILTER PAPERS 21
- CONDITION EVALUATION 23
- HYDROGEN ION CONCENTRATION (pH) 25
- ALKALINE RESERVE 26
- COMPLETNESS OF DEACIDIFICATION 27
- TESTS REQUIRING ACCELERATED AGING 28
  - FOLDING ENDURANCE 30
  - TENSILE PROPERTIES 31
  - BRIGHTNESS 32
  - OPACITY 33
  - SODIUM HYDROXIDE SOLUBILITY 34
  - RETENTION OF ALKALINE RESERVE 35

TEST RESULTS 36
MOISTURE CONTENT 36
ODOR EVALUATION 38
TEMPERATURE EXPOSURE 40
FILTER PAPER EVALUATION 41
CONDITION EVALUATION 42
HYDROGEN ION CONCENTRATION (pH) 44
ALKALINE RESERVE 45
COMPLETENESS OF DEACIDIFICATION 46
ACCELERATED AGING DATA 47
MIT FOLD 47
TENSILE PROPERTIES 48
BRIGHTNESS 50
OPACITY 51
SODIUM HYDROXIDE SOLUBILITY 52
RETENTION OF ALKALINE RESERVE 52

APPENDIX (Individual Test Results) A-1

SUMMARY

The Library of Congress has more than 85 million books and other works on paper in its General and Law Collections. Many of these had been printed on acid-based paper and, thus, are deteriorating at a rapid rate.

Several mass deacidification processes are now available which offer the opportunity of extending the life of the collection. The Library intends to select one of these processes to treat as many books in the collection as will benefit from the treatment.

Toward this end, samples of about 500 old and new books were treated by each of three processes. The treated books, along with a similar sample of untreated books, were tested in the laboratories of the Institute of Paper Science and Technology for a variety of properties. The Library plans to use the test results to assist it in the selection of a treatment process.

This report presents the results of the tests made on books which had not been treated. Similar data for books treated by FMC Corporation are given in Report 1, those for books treated by Akzo Chemicals, Inc. are given in Report 2, and those for books treated by Wei T'o Associates are given in Report 3.

It is not within the scope of this project to comment on the relative merits of the various deacidification processes.

BACKGROUND

This project was undertaken to obtain data documenting the results of laboratory tests and evaluations of samples taken from sets of books treated by mass deacidification processes. Test results for Demonstration Set 1 treated by FMC Corporation are given in Report 1; those for Demonstration Set 2 treated by Akzo Chemical are given in Report 2; and those for Demonstration Set 3 treated by Wei T'o Associates are given in Report 3. This report gives test results for Demonstration Set 8 which was submitted by the Library, and had not been treated.

Due to the acid content of paper, books in the Library of Congress, hereinafter called the Library, collection are deteriorating at a rapid rate. About 25 percent, or 3.5 million volumes, of the General and Law collections are presently classified as brittle. Each year, a significant number of additional books become similarly brittle.

The Library seeks to preserve and extend the life of paper-based books in their present physical format before they reach a completely unusable condition. To abate, insofar as practicable, the embrittlement of acidic books, and to protect the collections from the future effects of acid-related damage, the Library has decided to deacidify all paper-based books which will benefit from the process. The library intends to select a process from the deacidification technologies available today.

To this end, the Library issued a request for proposals to provide deacidification on a mass production level for paper-based books in the collections of the Library. Offerors submitting proposals were required to deacidify a demonstration set of approximately 500 books to confirm the effectiveness of their proposed process.

Each treated demonstration set, in addition to a comparable untreated control set, were sent to the Institute of Paper Science and Technology hereinafter called the Laboratory. These were then tested under uniform conditions for a variety of physical, chemical, and appearance properties.

Properties evaluated included moisture content, odor, general condition, temperature exposure, leaching of inks and dyes, pH (hot and cold extract), alkaline reserve and completeness of deacidification. Selected samples were subjected to accelerated aging at an elevated temperature in a humid environment. These were tested to determine the degradation rates of folding endurance, tensile properties, brightness, opacity, hot alkali solubility, and retention of alkaline reserve. Except where inappropriate, samples for each test were randomly selected.

Each demonstration set was identified with a demonstration set number and the name of the mass deacidification offeror. Additional codes were used to identify boxes, individual books, and parts of books. The relationship between these various systems of identification were only known to those people responsible for management of the testing project. All testing was done "blind", i.e., testing personnel were unaware of the identity of the offeror whose samples were being tested.

The procedures used for performing the various tests, and a summary of the test results for this demonstration set, are given in the main body of this report. The individual test results are given in the Appendix.

DEMONSTRATION SETS

Each demonstration set consisted of a sample of approximately 500 books generally representative of the Library's General and Law collection. Each demonstration set was made up of the items listed below:

1. Old Books - A collection of 385 old books, chosen to be representative of the Library's collections.

2. New Books - A collection of approximately 100 new books purchased for demonstration and testing. These 100 books were identical in each demonstration set, and were distributed throughout the demonstration set.

3. Half Books - A collection of 17 half books (included among the books described above). Half books are books that have been cut into two equal pieces by the Library. The bottom halves were treated by the mass deacidification offeror, and the untreated top halves were sent from the Library directly to the Laboratory.

4. Temperature Sensors - Approximately 40 temperature sensors, attached in pairs to approximately 20 books distributed throughout each demonstration set.

5. Attached Filter Papers - Samples of filter paper inserted in or attached to the cover of approximately 25 books, in order to detect softening and leaching of inks and dyes.

6. Loose Filter Papers - Twenty five filter paper samples not attached to any book, each piece in a separate plastic sleeve. These samples had been distributed evenly throughout the deacidification chamber or, for continuous flow/sequential processes, throughout the process flow by each mass deacidification offeror in the treatment stage.

7. Test Books - A collection of approximately 15 identical books that had been assembled to include a variety of new papers described in the next section of this report.

The demonstration sets were shipped to the Laboratory in corrugated boxes. Each box contained an average of twelve (12) books. The books in each box were double wrapped in plastic bags, with each bag tied shut. Each box had been taped shut after the bagged books were inserted.

COMPOSITION OF TEST BOOKS

Several different test papers had been used to assemble the Test Books. The kinds of papers used, their quantity, and their order within each Test Book are identified below. Only parts G, H, K, and M were used for testing in this project.

Book Part	Description
A	Cover of Heckman 598 Navy Blue Buckrum over binder board
B	Two (2) flyleaves
C	Clear Spring Offset, 16 sheets
D	One sheet of brown paper
E	Filler paper of ordinary white printing Paper - 1 3/8"
F	One sheet of brown paper
G	Clear Spring Offset, 16 sheets
H	Alum rosin sized paper, 16 sheets
I	Sterling Litho Gloss, 8 sheets
J	Supercalendered paper, 32 sheets
K	Alkaline sized paper, 16 sheets
L	Alkaline sized paper, 8 sheets
M	Newsprint, 16 sheets
N	Whatman No. 1 filter paper, 8 sheets
O	One sheet of brown paper
P	Filler paper of ordinary white printing paper - 1 3/8"
Q	One sheet of brown paper
R	Clear Spring Offset, 16 sheets
S	Two (2) flyleaves
T	Cover of Heckman 598 Navy Blue Buckrum over binder board Key:

Alkaline Sized:	Mowhawk Super Fine White Text Smooth Finish, Alkaline sized. Mill no. 20-1718; Basis weight 70 lbs.; acid free, Ph 7.5+; alkaline buffer; alum and rosin free; not coated; some calendaring; brightness 88; opacity 95.5 to 96.
Alum Rosin Sized:	Hammermill South Shore Offset White Smooth Finish. Mill no. 73514-A1; Basis weight 50 lbs.; alum rosin sized; uncoated; not super calendared; brightness 82; contains alum rosin if purchased before June 1988.
Clear Spring Offset:	Westvaco Clear Spring Offset. Basis weight 70 lbs.; uncoated; brightness 77 to 81.
Newsprint:	Newsprint, Natural Shade. JCPA 10, Property #056502; acid.
Sterling Litho Gloss:	Westvaco Sterling White Litho Gloss. Basis weight 70 lbs.; coating is alkaline; core is acid; gloss; coated; brightness 83 to 84.
Supercalendered:	Hammermill Lustre Opaque Offset, supercalendered, uncoated. Mill No. 25 x 35 - 140M - S70; #14083-0; Basis weight 140 lbs.; uncoated; white; alkaline; brightness 92.
Whatman No. 1:	Fisher Scientific, Whatman No. 1.

IDENTIFICATION OF ITEMS IN DEMONSTRATION SETS

Each item in a demonstration set had been previously labelled by the Library with a barcode label containing a unique Control Number. Labelling procedures specific to each type of item are given below.

Books - A barcode label containing the assigned control number was affixed to the spine, or to the front cover of narrow books. An identical label, containing the same control number, was affixed to the title page. The control number was also written in pencil on the title page.

Half Books - Half books received labels on both halves. The control numbers assigned to the two halves were identical except for a single letter suffix: "A" for the top half, and "B" for the bottom half.

Filter Papers - Both the loose filters and those attached to books were identified with a barcode label and had the control number written in pencil.

Temperature Sensors - Each temperature sensor (self-adhesive model #240 Wahl "Temp-Plate Recorder") had a barcode label attached adjacent to it.

All of the above labels were assigned and attached by the Library. The unique control number for each unit is used to identify all data in this report.

Further coding of samples was done by the Laboratory to assist in sample tracking, retrieval, and storage. For this purpose, each shipping box, regardless of the source demonstration set, was assigned a randomly selected three number code. Each item in the box was identified by this code along with a sequential number (1, 2, 3, etc.). Further identification included a book part (letter) and sheet sequence number for test books, a page number for non-test books, or a sheet number for filter papers. Additional numbers were added to this code to identify parts of pages where required, and/or aging periods for samples exposed to accelerated aging.

The code numbers assigned by the Laboratory were marked in ink on all samples and/or specimens, and was used to identify all data recorded on data sheets or in research notebooks. Testing personnel were not apprised of the relationship between these codes and either the demonstration set number or the name of the mass deacidification offeror.

RECEIPT AND STORAGE OF BOOK SHIPMENTS

Upon receipt of a demonstration set, a preliminary inventory was made by the Laboratory, comparing packing lists attached to boxes with a comprehensive list provided by the Library. No discrepancies were found for the demonstration set included in this report.

The boxes were then marked with the Laboratory code numbers and stored on library type shelves. The storage area was maintained at 75 +/- 5 degrees F and 50 +/- 5 percent relative humidity.

From a separate list of boxes containing test books or half books, one box containing a test book and one containing a half book were randomly selected. These were marked "Unopened at Laboratory", the contents were not further inventoried, and the items in the boxes were excluded from those available for testing.

The sealed boxes and bags in which the demonstration books were shipped were not opened until it was necessary to retrieve a selected sample. At that time, the contents of the box were inventoried and compared with the packing list for the box. The required sample was removed and the bags and box immediately resealed. No inventory discrepancies were found for any of the boxes of this demonstration set.

Special care was taken in handling of samples selected for the following two tests:

a. Moisture content - Books selected for this test were kept sealed in the bags and boxes in which they were shipped until the time the testing began. At that time, each selected book was extracted from the shipping box and immediately sealed in a tared moisture-proof bag.

b. Odor evaluation - To insure that all books selected for this procedure were exposed to ambient air for an equal amount of time when evaluated, the books were kept sealed in the shipping boxes and bags until the panel was convened. Selected books were then extracted from the shipping boxes and sealed in individual moisture-proof bags. The individual bags were removed from all selected books two hours before the panel began the evaluation.

Upon completion of testing, all books were repacked in their original bags and boxes, and in their original order within each box. Filter papers removed from books for evaluation were repacked, each in a separate protective sleeve, in the final box of each demonstration set. Specimens which had been tested for fold endurance, tensile properties (except those used for alkali solubility), and brightness were placed in suitably identified envelopes and stored with this demonstration set.

TESTING PROCEDURES

All data were derived by (a) using standard test procedures of the Technical Association of the Pulp and Paper Industry (TAPPI) or the American Society for Testing and Materials (ASTM), or modifications of these test procedures as prescribed by the Library; or (b) following fixed protocols established by the Laboratory and approved by the Library for odor and condition evaluation panels.

The following official test methods of TAPPI, Technology Park, P.O. Box 105113, Atlanta GA 30348-5113 were used in part or in whole in testing untreated and deacidified books:

- T212 One percent sodium hydroxide solubility of wood and pulp.
- T402 Standard conditioning and testing atmospheres for paper, board, pulp handsheets, and related products.
- T412 Moisture in paper and paperboard.
- T425 Opacity of paper.
- T435 Hydrogen ion concentration (Ph) of paper extracts (hot).
- T452 Brightness of pulp, paper, and paperboard.
- T483 Odor of packaging materials.
- T494 Tensile breaking properties of paper and paperboard (using constant rate of elongation apparatus).
- T509 Hydrogen ion concentration (pH) of paper extracts (cold).

T511 Folding endurance of paper (MIT tester) (0.5 kg tension).

T544 Effect of moist heat on properties of paper and board (50% relative humidity generated in a moist oven was substituted for 25% relative humidity generated in a two-bath control system).

The following standards published by ASTM, 1916 Race Street, Philadelphia PA 19103-1187 were used in part or in whole in testing the untreated and deacidified books:

D4988 Determination of calcium carbonate content of paper (in vol. 15.09, p. 804)

E619 Standard practice of evaluation of foreign odors in paper packaging (in vol. 15.07, p. 31).

The following publications of ASTM were consulted for the creation and functioning of the odor evaluation panel:

STP 434 Manual on Sensory Testing Methods (1968).

STP 758 Guidelines for the Selection and Training of Sensory Evaluation Panels (1981).

Many of the procedures require random selection of books or paper samples from those available for test. This objective was met by first listing the units available for the required test in order of control number. A random number was then generated from a population equal to the number of units. The control number corresponding to the generated random number was then selected for the test. For example, if 15 test books were available for a given test, and the number 3 was randomly generated from a population 1 to 15, then the test book having the 3rd lowest control number would be selected.

The tests described below were performed on each demonstration set received, including the untreated control set supplied by the Library. Tests were performed on individual books and book parts. In no case were specimens from different books or book parts combined for testing.

Moisture Content

Moisture content was determined in two ways:

(A) on whole books

(B) on sheets taken from books

(A) WHOLE BOOKS

Objective: The object of this procedure is to determine the moisture content of whole deacidified books.

Sample Selection: Ten (10) non-test books were selected at random from each demonstration set for this test.

Preparation for Test: The books selected for this test remained sealed in the boxes and bags in which they were shipped until the time scheduled for testing. At the scheduled time, each selected book was removed from the shipping box and placed in a tared, moisture-proof bag.

Testing: (a) Each bagged book was weighed to the nearest 0.2 gram, and the weight of the bag was subtracted in this and future weighings.

(b) Each book was removed from its bag and exposed in a vacuum oven at 105 degrees C for 24 hours, with a vacuum pulled continuously on the oven.

(c) Each book was removed from the oven at the end of 24 hours, placed in the tared plastic bag, allowed to cool, and weighed.

(d) Steps (b) and (c) were repeated until the weight change between two successive weighings did not exceed 0.5 grams.

(e) Using the last weighing as the oven-dry weight of the book, the moisture content was calculated based on the initial moist weight of the book.

(B) MOISTURE CONTENT OF SHEETS FROM A BOOK.

Objective: The object of this procedure is to measure the moisture content of individual sheets taken from deacidified books. The procedure and precautions stated in T412 were used during this test.

Sample Selection: Four (4) non-test books were selected randomly from each demonstration set for use in this test.

Preparation of Specimens: Four (4) sheets were selected from each book. The sheets were taken from locations approximately 1/5, 2/5, 3/5 and 4/5 through each book. Each sheet was torn from the book, torn into pieces, and stuffed into a tared weighing bottle, all in less than 5 seconds. The page number of each sheet was noted in the specimen identification.

> Note: The inside of a closed book responds very slowly to forces that would change its moisture content. However, when the book is opened, the exposed leaves will quickly absorb or desorb moisture, depending on the relative humidity of the surrounding atmosphere and the moisture content of the book. The 5 second time limitation was aimed at minimizing this effect.

Testing: (a) Each specimen was weighed in the weighing bottle to the nearest 0.001 gram and the weight of the bottle subtracted in this and future weighings.

(b) The specimens were exposed in a circulating oven controlled at 105 degrees C for 30 minutes. The bottle stoppers were removed during this and subsequent exposures.

(c) The bottles were restoppered at the end of the 30 minute exposure before removing the bottles from the oven.

(d) The bottles were removed from the oven and allowed to cool for 15 minutes.

(e) The stopper was loosened to allow pressure to equilibrate, and the bottle was weighed.

(f) Steps (b) through (e) were repeated, doubling the oven exposure time for each subsequent cycle, until two successive weighings did not differ by more than 0.1% of the weight of the specimen.

(g) Using the last weighing as the oven-dry weight, the moisture content was calculated based on the moist weight of the specimen.

Odor Evaluation

Objective: The objective of this procedure was to determine if any detectable odor was generated by the deacidification process. For this purpose, books were evaluated by a panel comprised of two librarians and two book conservators. The selection, qualification, and training of panelists, and the testing protocol, were based on TAPPI T483, ASTM E619, ASTM STP434, and ASTM STP 758.

Qualification of Panelists: The paired comparison technique described in ASTM STP434 was used to qualify the panelists. For this purpose, each panelist was first presented with five odors along with their identification. Each of the five odors was then presented along with a similar comparison odor, and the panelist was asked to identify the original odor. All of the selected panelists were able to pass this test without an error. The test was administered by a professional from Emory University.

Sample Selection: Twenty-five non-test books were selected at random from this demonstration set. Further randomizing was done combining the list of books from this demonstration set with that for 2 other treated demonstration sets and the untreated control set.

Preparation for Evaluation: Each selected book was removed from its sealed shipping bag and immediately placed in a separate zip-lock bag. This step was taken two hours before the panel was ready to begin evaluations. Just prior to the evaluation, the books were removed from the zip-lock bags in the established random order and distributed on tables.

Evaluation: The ASTM Odor Characterization procedure was used for the evaluation. Panelists were instructed to fan the pages of the book being tested and then record their first impression. ASTM recommends a minimum of 40 seconds between successive specimens to restore discriminating power. The panelists were instructed to use a time interval of at least 60 seconds, and to take rest periods whenever they felt the need.

Each book was evaluated on a 5-point intensity scale as follows:

None (0 points)	- No detectable odor.
Threshold (1 point)	- Detectable odor with intensity so low that it cannot be identified.
Slight (2 points)	- The lowest intensity odor which can be identified.
Medium (3 points)	- Subjective level between Slight and Strong.
Strong (4 points)	- Overpowering odor.

Summing the points for the twenty-five books of each demonstration yields a score ranging from 0 if there is no detectable odor in any of the books, to 100 if the odor is judged overpowering for all twenty-five books.

Temperature Exposure

Objective: The objective of this test was to determine whether any books had been exposed to temperatures higher than 70 degrees C (158 degrees F) during the deacidification process.

Sensor Locations: Temperature sensors were attached in pairs to selected books before the treatment process. One of each pair of sensors covered a temperature range of 120 to 180 degrees F, and the other a range of 160 to 220, degrees F. Each pair of sensors was attached to one of four locations, front cover, back cover, spine, or inserted in the text block.

Sample Selection: A list of all books containing sensors was provided by the Library. All of these, except for those in boxes designated to remain unopened were evaluated.

Testing: Each sensor was examined to determine the maximum temperature to which it had been exposed. The results for temperature sensors which did not indicate any temperature exposure within the range of the sensor were recorded as <120 for the low range sensor, and <160 for the high range sensor.

Evaluation of Filter Papers

Filter papers were exposed to the deacidification processes in two ways:

A. Loose filter papers

B. Filter papers attached to books

Objectives: The object of this procedure is to determine if any inks or dyes have leached out of the cover, text, or illustrations of deacidified books.

Sample Selection:

All filter papers, except those in boxes that remained unopened, were evaluated. These included the following:

A. Twenty five loose filter papers were received with each demonstration set. These were packaged in plastic sleeves and separated from the books of the demonstration set. They had previously been evenly distributed through the deacidification process.

B. Approximately twenty books of each demonstration set had filter papers attached to the cover or to a page of the text block.

Evaluation: The filter papers were evaluated by two staff professionals of the Optical Properties Group at the Laboratory.

A. The loose filter papers for each treated demonstration set were evaluated subjectively for any evidence of color change, relative to control samples that had not been through a treatment process. The evaluation included an estimate of luminosity change (same, lighter, darker) and direction of color change (red, yellow, green, blue).

B. The attached filter papers were examined for evidence of any leaching of inks or dyes from the surface against which they were placed. A subjective estimate was made of the percent of area of each attached filter showing bleeding or leaching.

Condition Evaluation

Objective: The objective of this evaluation is to gather data on the general condition of books that have been treated by a deacidification process.

Panel: A panel was convened for the purpose of examining and reporting on the condition of books after deacidification. The panel was composed of two (2) professional librarians, two (2) book conservators, and two (2) paper conservators. One panelist in each category was an employee of the Library.

Sample Selection: The panel evaluated the general condition of all books in each demonstration set, except for those in the following categories:

(a) Test Books

(b) Non test books selected for moisture, pH, and alkaline reserve tests.

(c) Books packed in the two boxes that remain unopened.

Evaluation:

(a) Whole Books. Panel members examined each book for process related abnormalities of the cover, labels, text block, ink, paper, and binding, and for any evidence of cockling or abnormal shape or condition. Check off data sheets were used to record any observed abnormality. The panelists were also asked to record any comments they felt were appropriate to help describe the condition of the books.

(b) Half Books. For half books included in each demonstration set, the corresponding untreated halves were sent directly from the Library to the Laboratory. The panelists compared each treated half book with its corresponding untreated half for indications of change in or damage to the same areas as described above for whole books.

Testing Protocol: All of the books from one box were presented to each panelist as a group. The books were removed from the box and placed on a library display table, so that the panelists did not know from which demonstration set the books were taken. The boxes from all four demonstration sets were grouped and then randomized. The books were repacked in their original boxes after the panelists had completed their evaluations.

Rejection Scoring: Each panelist was allowed to reject a book in one or more of seven categories: shape, front cover, spine, back cover, front end plate, back end plate, and text block. For each category, the number of books rejected by a given panelist was divided by the number of books in the demonstration set, and this result multiplied by 100 to obtain a percent rejection. The rejection score for the demonstration set was finally calculated as the average percent rejection for the 6 panelists. Hence, a percent rejection of 100 indicates that all 6 panelists rejected all of the books of the demonstration set.

Hydrogen ion Concentration (pH)

Objective: The objective of this test is to determine the pH of samples of deacidified paper using both cold and hot extraction methods.

Sample Selection: Six non-test books, three half books, and one test book were randomly selected from each demonstration set for this test. The same samples were used for both the cold and hot extraction methods.

Preparation of Specimens: Five sheets were selected at random from each book (only from part G of the test book), and two specimens were taken from each sheet. Sheets adjacent to the selected five were used, if necessary, to obtain the required weight for the two specimens.

Testing: The cold extraction method described in TAPPI method T509 was used to determine the pH for the ten specimens of each book. The hot extraction method described in TAPPI method T435 was then used to determine the pH for the same ten specimens of each book.

Alkaline Reserve (percent calcium carbonate)

Objective: The objective of this test is to determine the level and uniformity of alkaline reserve in deacidified books.

Sample Selection: Ten non-test books were randomly selected from each demonstration set for this test.

Preparation of Specimens: Eight sheets were selected, in adjacent pairs, from each book. The four pairs were distributed approximately equally throughout the book, i.e., at locations approximately 1/5, 2/5, 3/5, and 4/5 through the book.

For each pair of adjacent sheets, the first sheet was cut in fourths vertically, and the pieces numbered 1, 2, 3, and 4, from left to right. The second sheet was cut in fourths horizontally, and the pieces numbered 5, 6, 7, and 8, from top to bottom. Each 1/4 sheet specimen was identified as to the number of the specimen and the book and page from which it was taken.

> Note: Pages adjacent to those selected were used, if necessary, to obtain the required weight for the specimens.

Testing: The alkaline reserve was measured for each specimen using the procedure described in ASTM D4988.

Completeness of Deacidification

Objective: The objective of this test is to measure the consistency of deacidification throughout a large sample of treated books.

Order of Test: The procedure was performed after the Condition Evaluation Panel had completed its work.

Sample Selection: All non-test books except those selected for moisture, pH, alkaline reserve, and those packed in boxes that remain unopened, were tested. A single page falling approximately at the center of each book was selected for testing.

Testing: Each selected page was inscribed, using a cotton swab dipped in a one percent chlorophenol red indicator solution, with three broad stripes - one vertical stripe running close to the gutter of the binding, and two diagonal stripes crossing at the center and connecting opposite corners of the page.

Books for which any part of the stripes indicated a yellowish color were classified as incompletely treated. For these, a second classification was made estimating the percentage of the striped area which was incompletely treated.

Tests Requiring Accelerated Aging of Samples

Accelerated Aging: Accelerated aging at 90 degrees C and 50% relative humidity was employed to test the long term stability of paper samples. The procedure described in TAPPI method T544, modified to 50% RH, was followed. All of the samples from one demonstration set were exposed together in a single aging chamber, and no other material was introduced into the chamber during the aging process. This same procedure was followed for all demonstration sets.

Two aging chambers were used simultaneously during this project. The codes used to identify samples within and between demonstration sets was necessarily known by the technician responsible for aging the samples. However, these codes were not provided to the testing technicians. Hence, personnel performing tests did not know the demonstration set source for the samples being tested.

Preconditioning: All samples were preconditioned for a minimum of 24 hours at 20% relative humidity before being introduced into the aging chamber. Samples were again preconditioned for 24 hours at 20% relative humidity after aging, and before conditioning at 50% relative humidity for testing.

Samples: The following test book papers were exposed to accelerated aging and used in subsequent testing:

Book Part G	Clear Spring Offset, acid
Book Part H	Alum-rosin sized paper
Book Part K	Alkaline sized paper
Book Part M	Newsprint, acid

Identification of Test Samples: The test sheets in each of the four book parts were numbered in the top righthand corner with ink before they were cut out for aging. The numbering sequence included the book number, section letter, and finally the sheet number which ranged from 1 to 16. The binding edge of the sheets was kept to the left in all subsequent operations.

Assignment of Samples to Aging Periods: Two of the 16 sheets were randomly selected for the unaged sample and for each of the 7 required aging periods.

Aging: After all of the required pages were cut, marked, and preconditioned, the samples were introduced into the aging chamber. The humidity control heaters were not activated until the temperature in the chamber had reached the control level of 90 degrees C. This step prevents any condensation of moisture on the sample.

The preselected samples were removed from the chamber after 3, 6, 9, 12, 18, 24, and 30 days. These were preconditioned as described earlier and then submitted to the test laboratory for conditioning and testing.

Folding Endurance

Objective: The object of this procedure is to determine the effect of deacidification on the stability of selected test papers, using MIT fold endurance as the criteria.

Sample Selection: Three (3) randomly selected test books from each demonstration set were tested. Tests were made for book parts G, H, K, and M.

Conditioning: All samples were preconditioned and conditioned in accordance with TAPPI T402 before testing.

Preparation of Specimens: Keeping the binding edge uniformly to the left, and cutting across the sheet, 12 specimens were cut from each of the two sheets selected per aging time, for each of the four sections of each book. The 12 specimens cut from each sheet were numbered from 1 to 12 starting with specimen number 1 at the top of the sheet.

Testing: MIT fold was measured as described in TAPPI T511 modified to 0.5 kg. tension. To avoid mixing samples, only one sheet was cut and tested at any one time. Cutting of the next sheet did not begin until the last tests were underway for the proceeding sheet.

Tensile Strength, Stretch, and Tensile Energy Absorption

Objective: The object of this procedure is to determine the effect of deacidification on the stability of selected test papers, using tensile properties (tensile strength, stretch, and tensile energy absorption) as the criteria.

Sample Selection: Three (3) randomly selected test books from each demonstration set were tested. Tests were made for books parts G, H, K, and M.

Conditioning: All samples were preconditioned and conditioned in accordance with TAPPI T402 before testing.

Preparation of Specimens: Keeping the binding edge uniformly to the left, and cutting across the sheet, 10 specimens were cut from each of the two sheets selected per aging time, for each of the four sections of each book. The 10 specimens cut from each sheet were numbered from 1 to 10 starting with specimen number 1 at the top of the sheet.

Testing: Tensile tests were made with a constant rate of elongation tester, as described in TAPPI T494. For each specimen, the tensile strength, stretch (percent elongation), and tensile energy absorption were recorded.

Brightness

Objective: The object of this procedure is to determine the effect of deacidification on the brightness of selected papers.

Sample Selection: Three (3) randomly selected test books from each demonstration set were tested. Tests were made for book parts G, H, K, and M. Only 8 of the 16 available sheets were schedule for brightness testing, 1 for unaged tests and 1 for each of the 7 aging periods. All 16 sheets were inadvertently tested, and the extra test results are included in the report.

Preparation of Specimens: From each sheet, 9 tabs were cut and numbered in accordance with the pattern shown below. Tabs were cut 65 x 90 mm.

1	2	3
4	5	6
7	8	9

Tab number 1 is the specimen cut from the top of the page nearest the binding edge.

Testing: The brightness of each of the 9 tabs was measured as described in TAPPI T452, with each tab backed by the other 8 tabs in numerical order.

The brightness of one tab of each sheet was measured with and without fluorescence.

Opacity

Objective: The object of this procedure is to determine the effect of deacidification on the opacity of selected papers.

Sample Selection/Preparation of Specimens: The specimens that had been used for the evaluation of brightness (all 3 books for each demonstration set, and all 4 parts from each book) were used as the source of specimens for this procedure. However, only those specimens which were unaged and those which had been aged 30 days were tested for opacity.

Testing: The opacity of each of the 9 tabs from each sheet was measured following the procedure specified in TAPPI T425.

One Percent Sodium Hydroxide Solubility

Objective: The object of this test is to determine the effect of deacidification on the hot alkali solubility of selected test papers.

Sample Selection: The remnants of the specimens used for the measurement of tensile properties were used as a source of specimens for this procedure. Specimens from three (3) test books were used for the measurement of tensile properties. Two (2) of these were selected randomly for the measurement of alkali solubility. Tests were made for book parts G, H, K, and M.

Preparation of Specimens: For each book part tested for tensile properties, 2 sheets were used as sources of specimens for each aging period. The remnants of those 2 sheets were combined, cut into small pieces, and mixed well. Two specimens were weighed out from the resulting batch for the measurement of alkali solubility.

Testing: TAPPI test method T212 specifies the use of a medium porosity filtering crucible for filtering the extract. It was found that the filtration process took many hours for some of the papers used in this study. With the approval of the Library, a course filter was substituted and the first 25 ml. of the filtrate was washed through a second time. Otherwise, the tests were made in accord with TAPPI T212.

Retention of Alkaline Reserve after Accelerated Aging

Objective: The object of this procedure is to determine how much alkaline reserve is retained after accelerated aging at 90 degrees C and 50% relative humidity.

Sample Selection: Two (2) randomly-selected test books from each demonstration set were tested. The alkaline sized paper (book part K) was not tested with this procedure. Tests were made using only book parts G, H, and M.

Preparation of Specimens: The two-sheet sample assigned to each aging period was cut into small pieces approximately 1 cm. square, and the pieces mixed well. Two (2) 1-gram specimens were weighed out from each sample for testing.

Testing: Alkaline reserve was determined for each 1-gram specimen using the procedure described in ASTM D4988.

TEST RESULTS

This section of the report includes a summary of the test results for all procedures and, where appropriate, a comparison of results for this untreated demonstration set and the 3 treated sets. It is not within the scope of this project to comment on the reasons for any differences.

The individual test results for all procedures are attached as an appendix to this report.

Moisture Content Data

The moisture content data is reported on Page A-1. For tests made on whole books, the results are given for each individual book in addition to the average and standard deviation for the 10 books. For tests made on individual pages from a book, the results are given for each page separately. The page number tested, and the control number of the book is also given. The reported average and standard deviation is for all 16 tests, 4 on each of 4 books.

The moisture contents for different pages taken from the same book may not always agree with each other. We attribute this to different grades of paper sometimes used for different sections of the same book.

The average whole book moisture content may be different from the average for individual pages. The whole book moisture includes that for the covers, spine, and adhesive, whereas the individual sheet moisture does not.

The results show that the moisture contents for this demonstration set is 5.56 and 4.99% for whole book and individual page measurements, respectively. This is somewhat higher than the moisture contents for any of the treated demonstration sets summarized below.

	Moisture Content, %			
Set	Whole Book	Individual Page	Report	Page
1	3.93	4.85	1	A-1
2	2.84	4.30	2	A-1
3	3.53	3.57	3	A-1

Odor Evaluation Data

The odor evaluation results for the four panelists, identified as A, C, D, and F, are given on Pages A-2 through A-5 of the appendix. These data show that all 4 panelists classified the odor for most of the books of this demonstration set as none or threshold. Only a few books were classified as slight or moderate.

As discussed earlier under procedures, summing the points for a given panelist for all twenty-five books, yields a numerical score for the demonstration set ranging from 0 (no odor) to 100 (strong odor). The score for each panelist, and an average score for the four panelists is shown in Figure 1. The results for the 3 treated demonstration sets (Reports 1, 2, and 3, respectively) are shown for comparison purposes.

The results show that there is a very little odor given off by the books in this demonstration set, which had not been treated.

The panelists were asked to comment on any items they considered appropriate. The following is a summary of these comments:

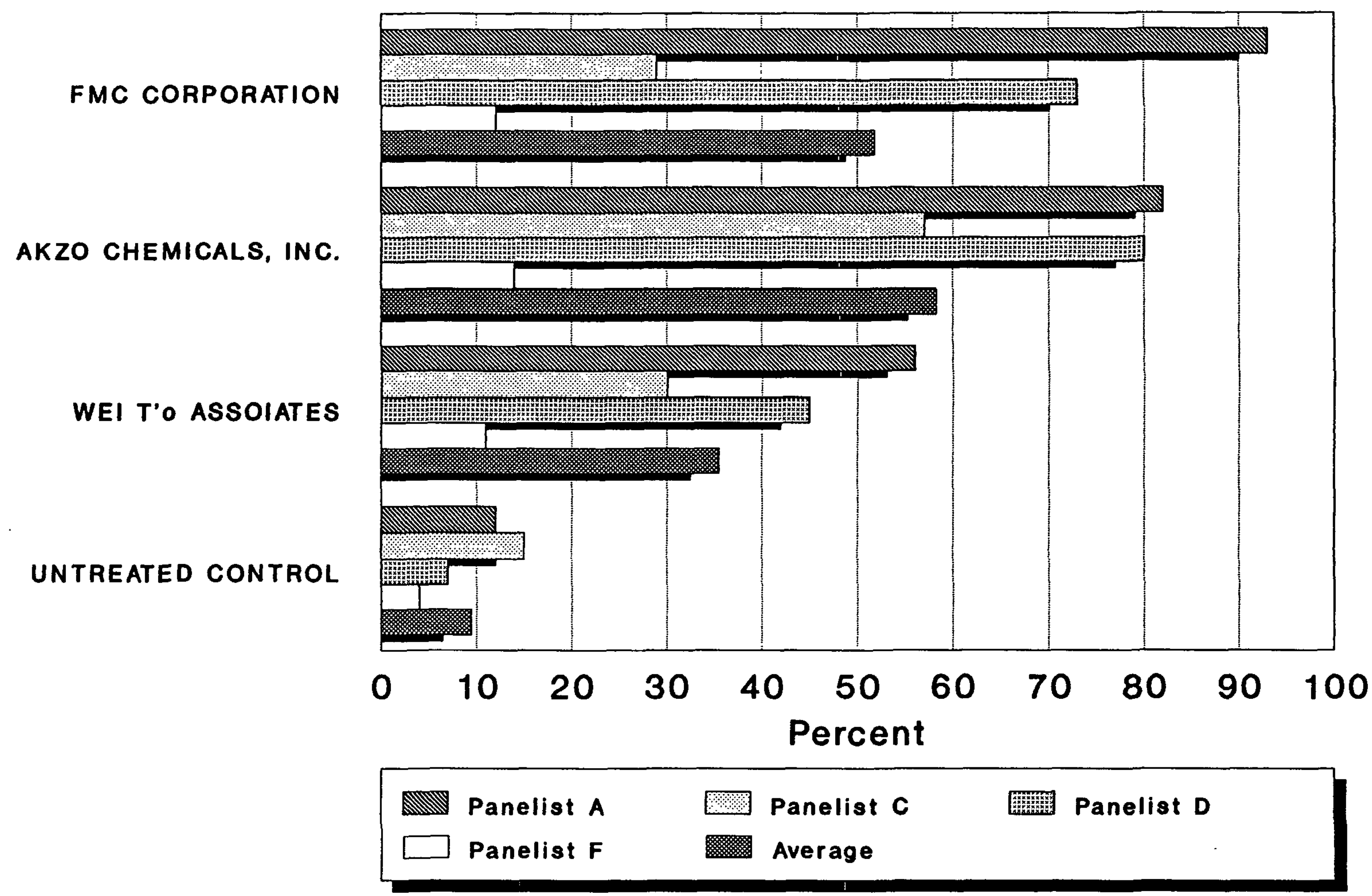
1. All four panelists stated that they developed headaches and sore throats during the evaluation.

2. All four panelists stated that their hands became tacky during the evaluation, presumably from handling the books.

3. One of the panelists noted that the odor from five books of this demonstration set was unpleasant.

It should be noted that the books from all four demonstration sets were intermixed during the evaluation. Hence, it is not known which, or how many, of the deacidification processes contributed to the health issues. Two of the four panelists noted that the tackiness was attributable to books from demonstration sets 1 (Report 1), and 2 (Report 2).

Odor Evaluation



25 books from each demo set

FIGURE-1

Temperature Exposure Data

The maximum temperature to which each sensor was exposed in given on Page A-6. The Table includes the link number of each book containing sensors, the corresponding control numbers of the two sensors, and the location of the sensors in the books. Sensors in 16 books were evaluated for this demonstration set.

The results show that the maximum exposure temperature was less than 120 degrees for all books of this untreated demonstration set.

Filter Paper Evaluation Data

Loose Filter Papers: The results for the loose filter paper evaluation for the treated demonstration sets are given in on Pages A-7 and A-8 of Reports 1, 2, and 3, respectively. As discussed earlier in the Procedure section, the treated filters were subjectively compared to filter papers of this demonstration set which had not been treated. Hence, there are no data to report for this untreated set.

The results in Reports 1, 2, and 3 show that all or most of the treated filters were judged to have changed in color relative to the control filters. For most of these, the filters appeared darker, with a color change toward yellow.

Attached Filter Papers. The results for the attached filter papers are given on Pages A-9 and A-10. The table gives the control number for each filter, the link number of the book to which it was attached, and a description of the location of the filter in the book. The last column in the table is the evaluators subjective estimate of the percent of area of the filter showing bleeding or leaching.

The results show that 100% of the filter papers were judged to show evidence of bleeding or leaching, ranging from a low of 1 to a high of 7%. The average area percent of area for all the filters in this demonstration set was 3.22, compared to 7.24, 4.30, and 4.70% for the filters in treated demonstration sets 1, 2, and 3, respectively. This comparison is shown in Figure 2.

It is surprising that the filters for the untreated were judged to show evidence of bleeding or leaching. Perhaps the filters contained some colored material before they were attached to the books.

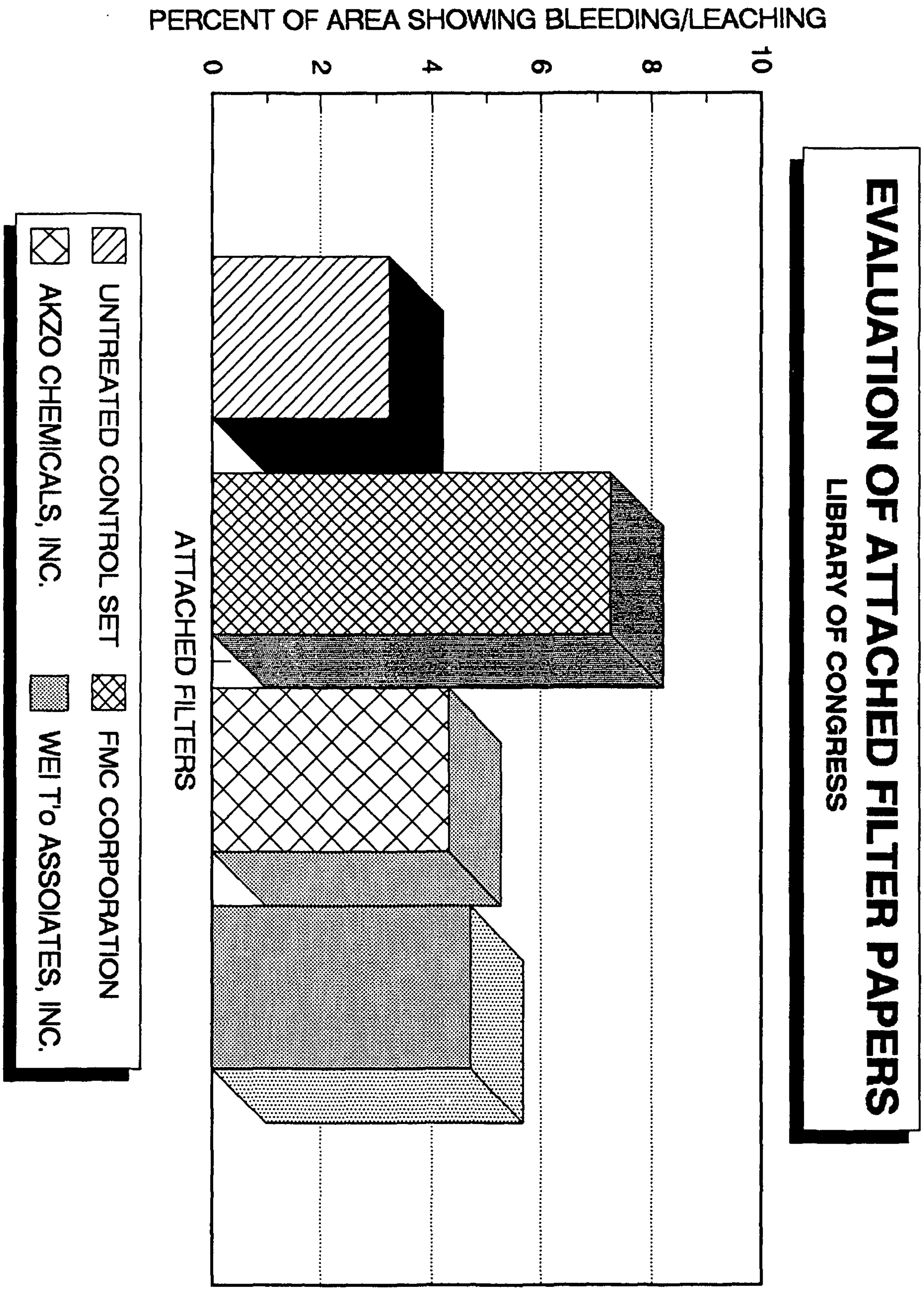

EVALUATION OF ATTACHED FILTER PAPERS
LIBRARY OF CONGRESS
PERCENT OF AREA SHOWING BLEEDING/LEACHING
0
2
4
6
8
10
ATTACHED FILTERS
UNTREATED CONTROL SET
FMC CORPORATION
AKZO CHEMICALS, INC.
WEI T'o ASSOIATES, INC.

FIGURE-2

Condition Evaluation

WHOLE BOOK

The whole book condition evaluation results are shown in Fig. 3. The plotted results are average rejection scores for the six panelists and for the 415 books evaluated. Results for the 3 treated sets are also shown.

As discussed in the procedure section of this report, the panelists were asked to evaluate each book for abnormalities of the cover, label, text block, ink, paper and binding, and for any evidence of cockling or abnormal shape or condition. For the scoring system used, a rejection score of 100 in any category would indicate that all six panelists noted abnormalities for all 415 books.

The results show a significantly lower rejection score for this demonstration set than for any of the three treated sets.

The panelists were also asked to make any comments they felt were appropriate to describe the condition of the books. The most frequent comments for this demonstration set were:

Shape:	No significant comments
Covers and Spine:	Dented covers
End plates:	No significant comments
Text Block:	No significant comments

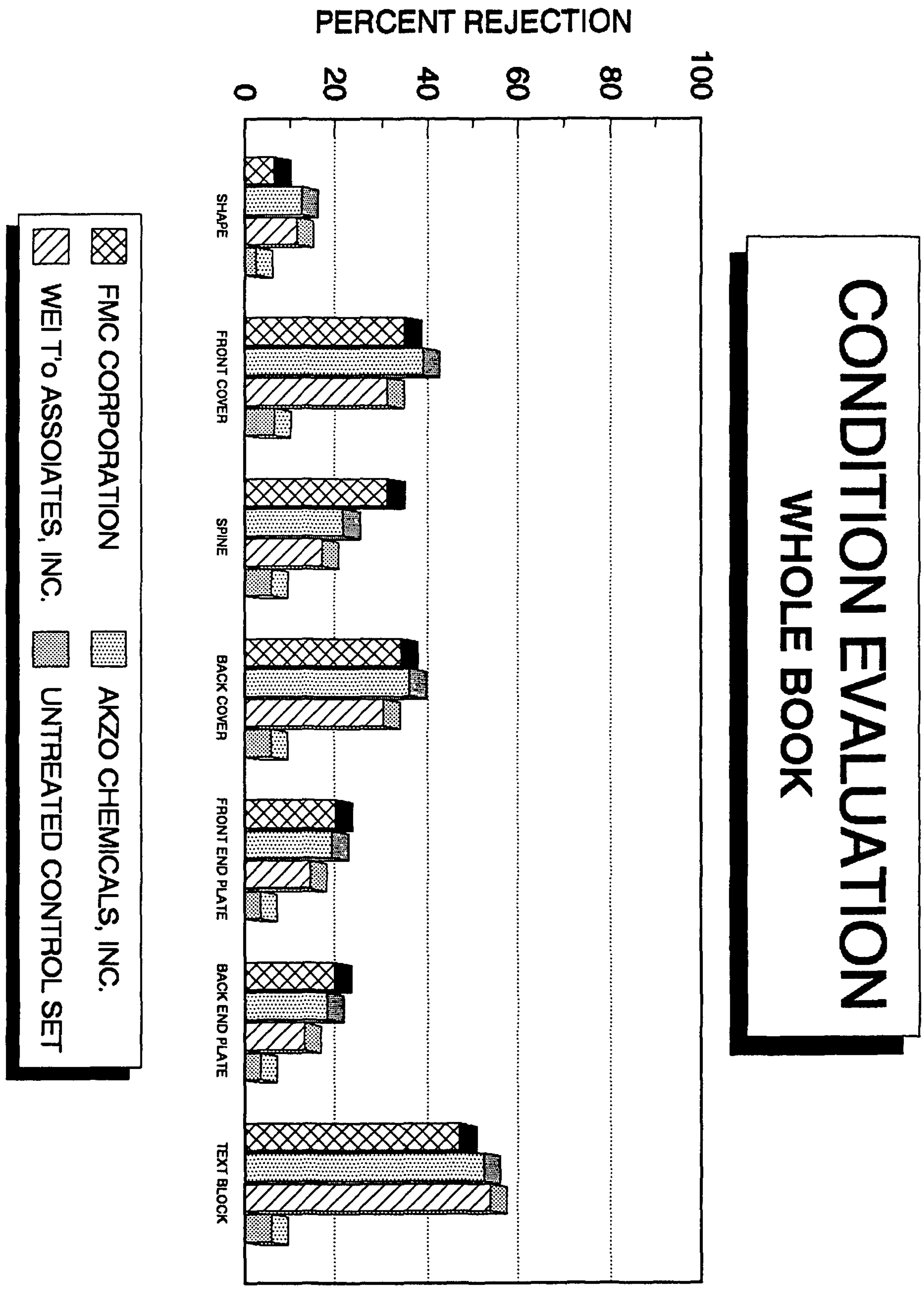

CONDITION EVALUATION
WHOLE BOOK
PERCENT REJECTION
0
20
40
60
80
100
SHAPE
FRONT COVER
SPINE
BACK COVER
FRONT END PLATE
BACK END PLATE
TEXT BLOCK
FMC CORPORATION
AKZO CHEMICALS, INC.
WEI T'o ASSOIATES, INC.
UNTREATED CONTROL SET

FIGURE-3

HALF BOOKS

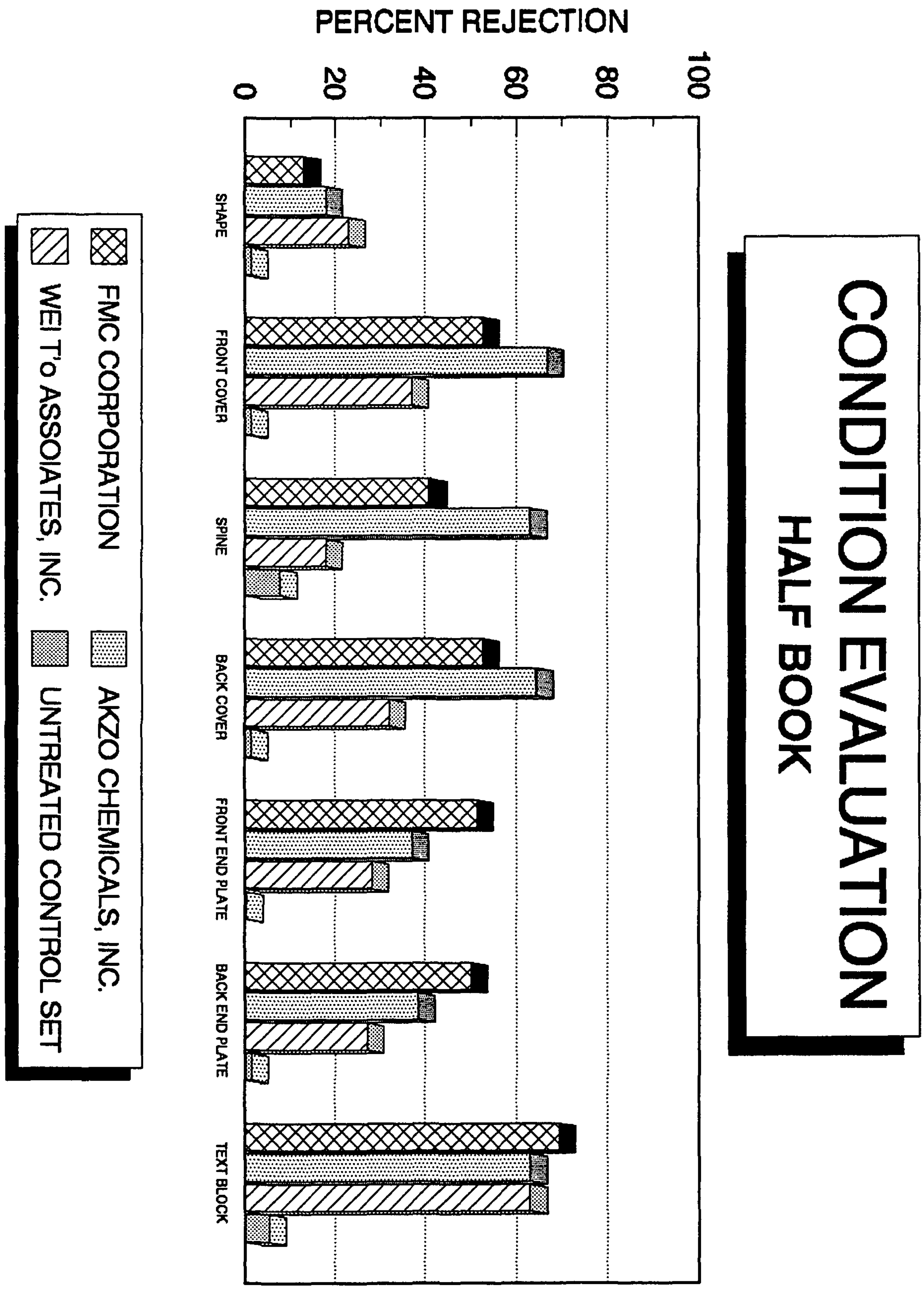
The half book condition evaluation results are shown in Fig. 4. The plotted results are average rejection scores for the six panelists and for the thirteen books. Results for the 3 treated sets are also shown.

As discussed in the procedure section of this report, the panelists were asked to determine whether the treated half books were changed or damaged relative to the corresponding untreated half books. For the scoring system used, a rejection score of 100 indicates that all six panelists noted change or damage for all of the treated half books in the demonstration set.

The results show a significantly lower rejection score for this demonstration set than for any of the treated demonstration sets. It should be noted that all of the panelists indicated that changes, where noted, were slight.

The panelists were also asked to comment on changes as appropriate. The most frequent comments were:

Shape:	No comments
Covers and Spine:	No comments
End plates:	No comments
Text block:	No comments



CONDITION EVALUATION
HALF BOOK
PERCENT REJECTION
0
20
40
60
80
100
SHAPE
FRONT COVER
SPINE
BACK COVER
FRONT END PLATE
BACK END PLATE
TEXT BLOCK
FMC CORPORATION
AKZO CHEMICALS, INC.
WEI T'o ASSOIATES, INC.
UNTREATED CONTROL SET

FIGURE-4

Hydrogen ion Concentration (pH) Data

The cold extraction pH data are reported on Pages A-11 to A-13. The ten individual results are given for each of the ten books. Book averages range from a low of 4.70 to a high of 9.55. For comparison purposes, book averages for the treated demo set ranged from 7.05 to 10.07, 7.55 to 9.50, and 7.87 to 10.43, for demonstration sets 1, 2, and 3, respectively.

The treated Test Book (part G) had an average pH of 5.60, while the Test Book for the treated sets had averages of 7.51, 7.98, and 8.93, for demonstration sets 1, 2, and 3, respectively.

The hot extraction pH data are reported in Pages A-14 to A-16. The ten individual results are given for each of the ten books. Book averages range from a low of 4.18 to a high of 9.70. For comparison purposes, book averages for the treated demo sets ranged from 6.03 to 9.33, 7.19 to 9.51, and 7.49 to 10.02 for demonstration sets 1, 2, and 3, respectively

The treated Test Book (part G) had an average pH of 4.82, while the Test Book for the treated sets had averages of 7.45, 7.79, and 9.28, for demonstration sets 1, 2, and 3, respectively.

Alkaline Reserve Data

The alkaline reserve data are given on Pages A17 to A-26. Each table gives the 32 individual results for a single book. The page numbers used for each group of four tests are also given.

The data show that the alkaline reserve for 6 of the 10 books of this untreated demonstration set was less than 0.1%. The other 4 had alkaline reserve results ranging up to about 8%.

By way of comparison, the alkaline reserve results for the treated demonstration sets were:

Demonstration Set 1 - Less than 0.1 for 9 of the 10 books tested, and greater than 3 for the 10th book.

Demonstration Set 2 - Between 1 and 11% for each of the 10 books.

Demonstration Set 3 - Between 0.3 and 4% for 9 of the 10 books, and 1 or 19% for different sections of the 10th book.

Completeness of Deacidification Data

The results of the completeness of deacidification tests are shown in Fig. 5. The results for the three treated sets are also shown.

The figure shows that 99.8 percent of the books of this demonstration set were classified as incompletely treated, compared to 94.7, 9.6, and 34.9 percent for treated demonstration sets 1, 2, and 3, respectively. As described in the Procedure section of this report, a book is classified as incompletely treated if the test indicates that any part of the test area is acidic.

Most of the books for this untreated set were judged to be incompletely treated over 100 percent of the test area. Because a few of the books were made of alkaline paper, Fig. 5 shows that 1.6% of the tested area was incompletely treated for this demonstration set. This compares to 32.7, 0.9, and 1.6% for treated demonstration sets 1, 2, and 3, respectively.

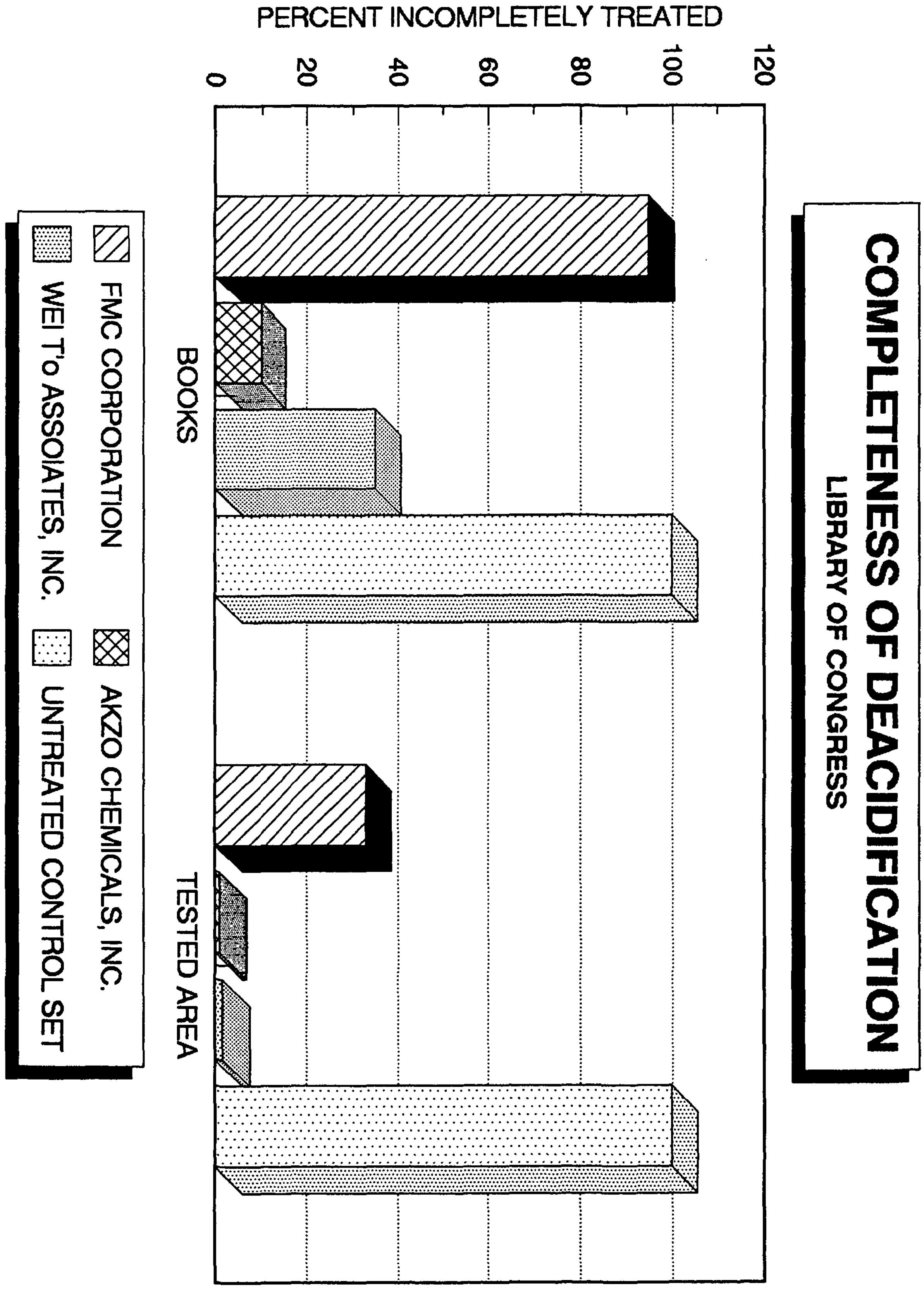

COMPLETENESS OF DEACIDIFICATION
LIBRARY OF CONGRESS
PERCENT INCOMPLETELY TREATED
0
20
40
60
80
100
120
BOOKS
TESTED AREA
FMC CORPORATION
AKZO CHEMICALS, INC.
WEI T'o ASSOIATES, INC.
UNTREATED CONTROL SET

FIGURE-5

Data for Samples Exposed to Accelerated Aging

The following sections of the report give the test results for samples which had been exposed to accelerated aging as described earlier under Procedure.

Folding Endurance (MIT) - The results of MIT fold tests for unaged samples, and for samples aged 3, 6, 9, 12, 18, 24, and 30 days are given starting on page A27 of the appendix. Following the tabulation of data are 12 plots of log fold against time of aging. Each plot represents data for 1 of 4 book parts (G, H, K, or M) of the 3 books used for this testing. Two sheets were tested for each aging interval, and the results for each sheet are shown separately in the plots. Error limits (+/- 1 standard deviation) are shown for each data point.

All of the data for each book part, and for each aging period, were averaged together. The regression lines for the grouped data are shown in Figs. 6-9 for the 4 book parts, respectively. Similar regression lines for the treated sets are shown in Reports 1, 2, and 3.

The decay rate per day in log fold for the treated samples, and for the untreated control is given below.

Book Part	Log Fold Degradation Rate Treated Samples			Untreated
	Demo 1	Demo 2	Demo 3	Control
Clear Spring Offset (G)	0.0104	0.0074	0.0062	0.0334
Alum-rosin sized paper (H)	0.0209	0.0123	0.0128	0.0415
Alkaline sized paper (K)	0.0024	0.0076	0.0061	0.0044
Newsprint (M)	0.0091	0.0032	0.0044	0.0349

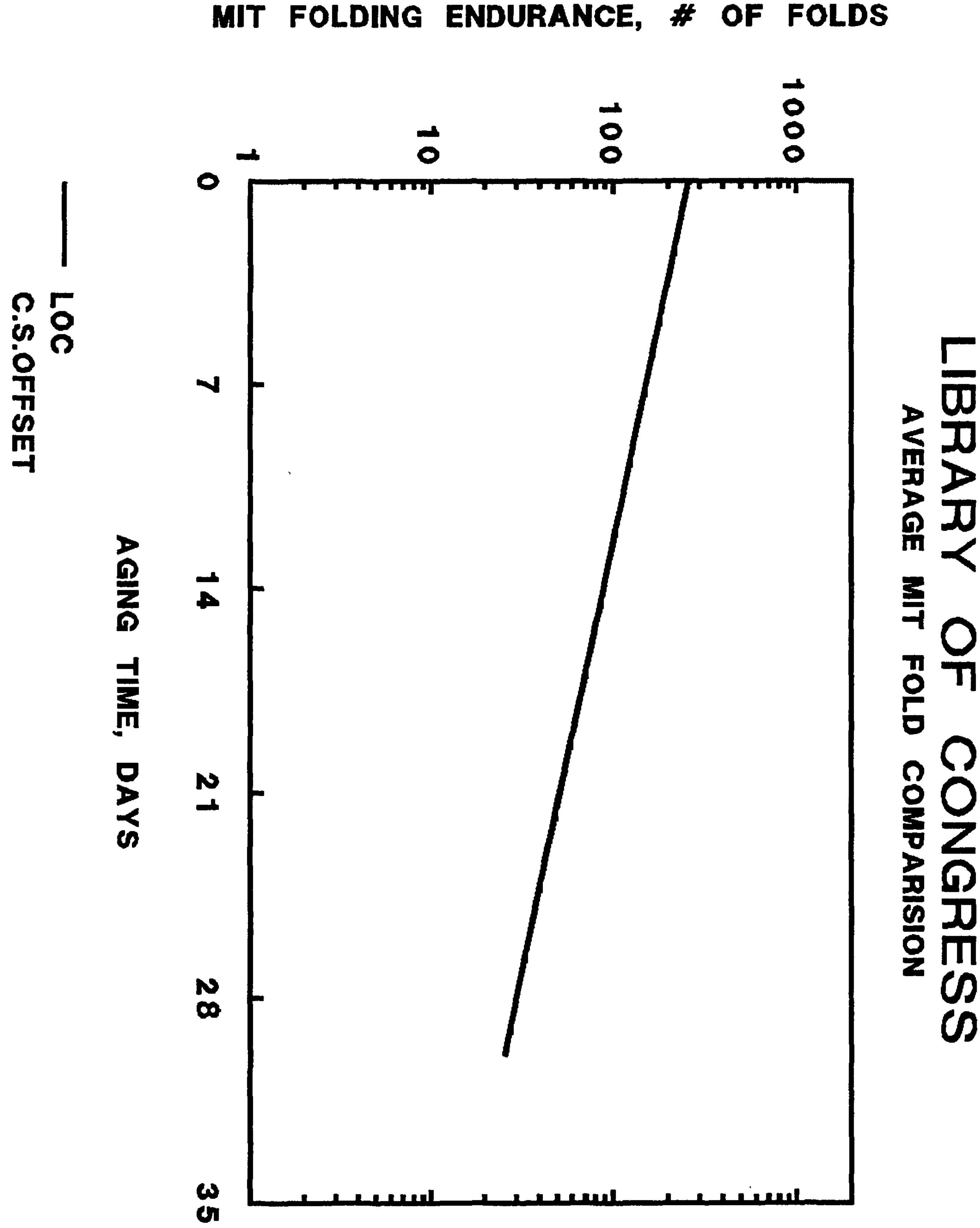

LIBRARY OF CONGRESS
AVERAGE MIT FOLD COMPARISION
MIT FOLDING ENDURANCE, # OF FOLDS
1
10
100
1000
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-6

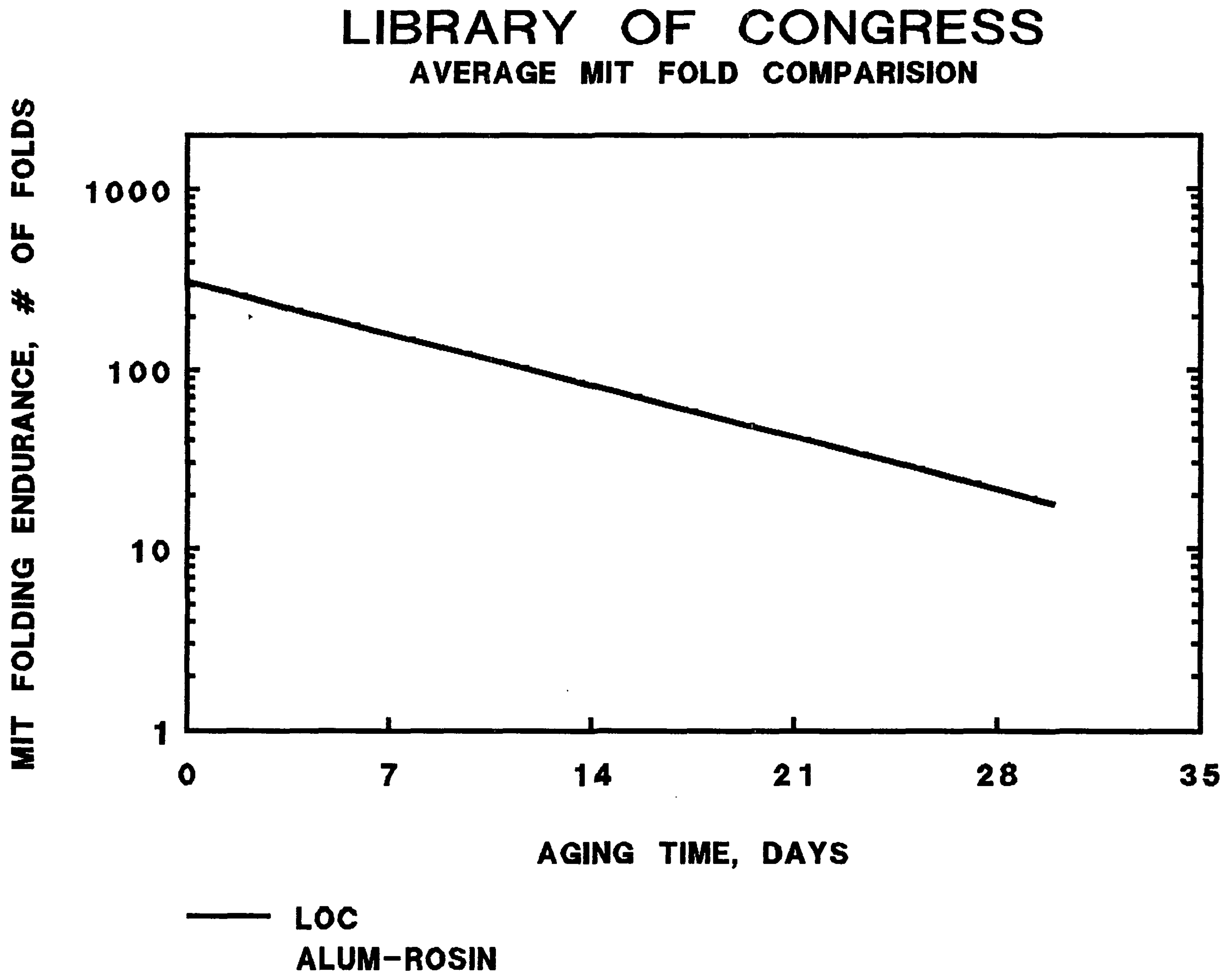

LIBRARY OF CONGRESS
AVERAGE MIT FOLD COMPARISION
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-7

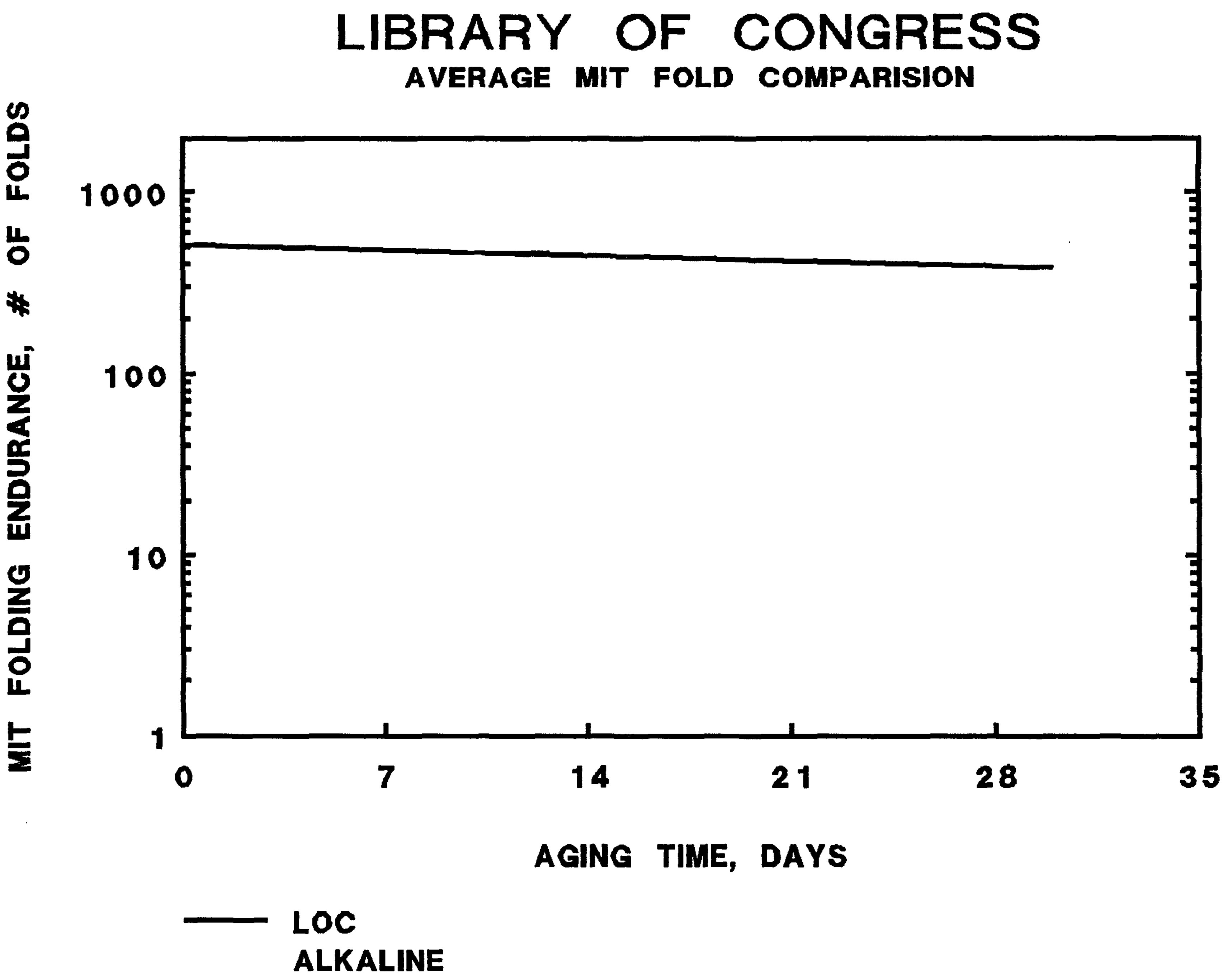

LIBRARY OF CONGRESS
AVERAGE MIT FOLD COMPARISION
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALKALINE

FIGURE-8

Load Elongation - The results of tensile strength tests (tensile, stretch (elongation) and tensile energy absorption) for unaged samples, and for samples aged 3, 6, 9, 12, 18, 24, and 30 days are given starting on page A87 of the appendix. Following the tabulation of data are plots of tensile, stretch, and tensile energy absorption against time of aging. Each plot represents data for 1 of 4 book parts (G, H, K, or M) of the 3 books used for this testing. Two sheets were were tested for each aging interval, and the results for each sheet are shown separately in the plots. Error limits (+/- 1 standard deviation) are shown for each data point.

All of the data for each book part, and for each aging period, were averaged together. The regression lines for the grouped data are shown in Figs. 10-21 for the 4 book parts, respectively. Similar regression lines for the treated demonstration sets are given in Reports 1, 2, and 3.

The decay rates per day for the treated samples, and for the untreated control is given below. These rates are in kN/m for tensile, % for stretch, and J/sq. m. for tensile energy absorption.

Tensile Degradation Rate

Book Part	Treated Samples Demo 1	Demo 2	Demo 3	Untreated Control
Clear Spring Offset (G)	0.001	0.004	0.005	0.009
Alum-rosin sized paper (H)	0.006	0.005	0.003	0.008
Alkaline sized paper (K)	-0.003	0.005	0.007	0.003
Newsprint (M)	-0.004	-0.001	0.004	0.009

A minus sign indicates that the strength increased with aging time.

Stretch Degradation Rate

Book Part	Treated Samples Demo 1	Treated Samples Demo 2	Untreated Demo 3	Untreated Control
Clear Spring Offset (G)	0.034	0.033	0.030	0.071
Alum-rosin sized paper (H)	0.036	0.034	0.028	0.047
Alkaline sized paper (K)	0.013	0.022	0.017	0.018
Newsprint (M)	0.003	0.004	0.006	0.008

Tensile Energy Absorption Degradation Rate

Book Part	Treated Samples Demo 1	Treated Samples Demo 2	Untreated Demo 3	Untreated Control
Clear Spring Offset (G)	0.76	0.76	0.86	1.81
Alum-rosin sized paper (M)	0.73	0.68	0.54	0.90
Alkaline sized paper (K)	0.29	0.66	0.64	0.54
Newsprint (M)	0.05	0.07	0.14	0.37

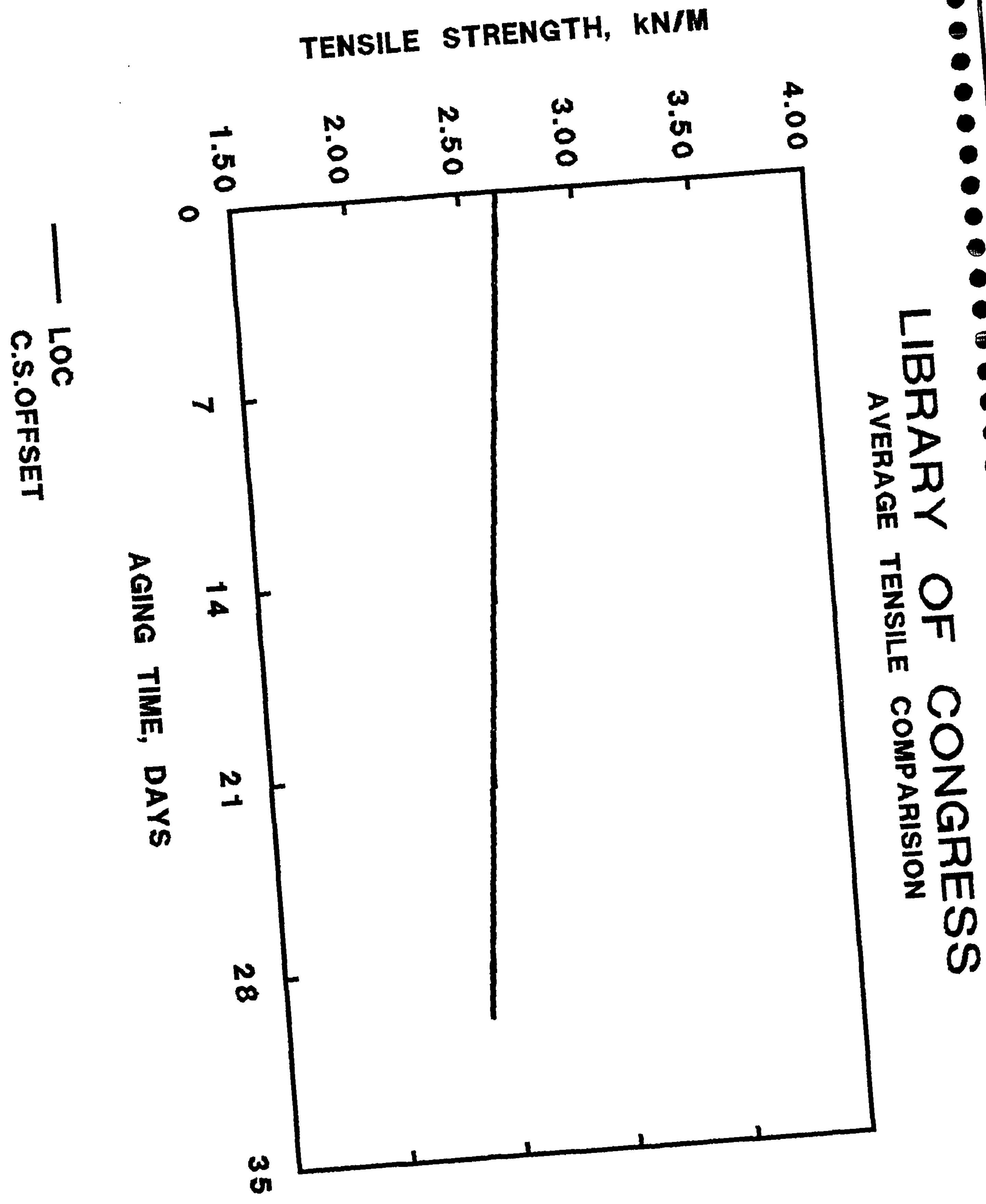

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TENSILE STRENGTH, kN/M
1.50
2.00
2.50
3.00
3.50
4.00
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-10

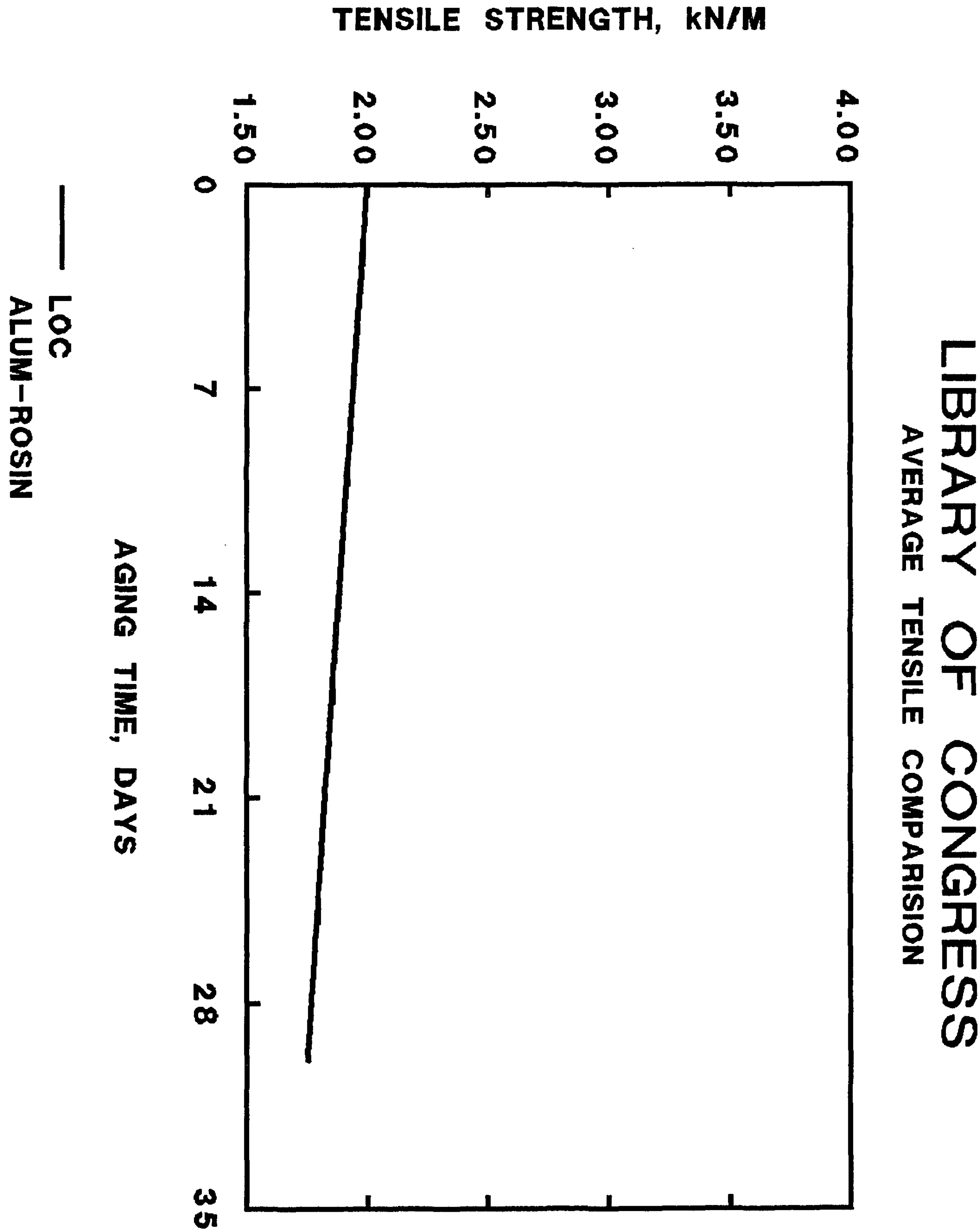

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-11

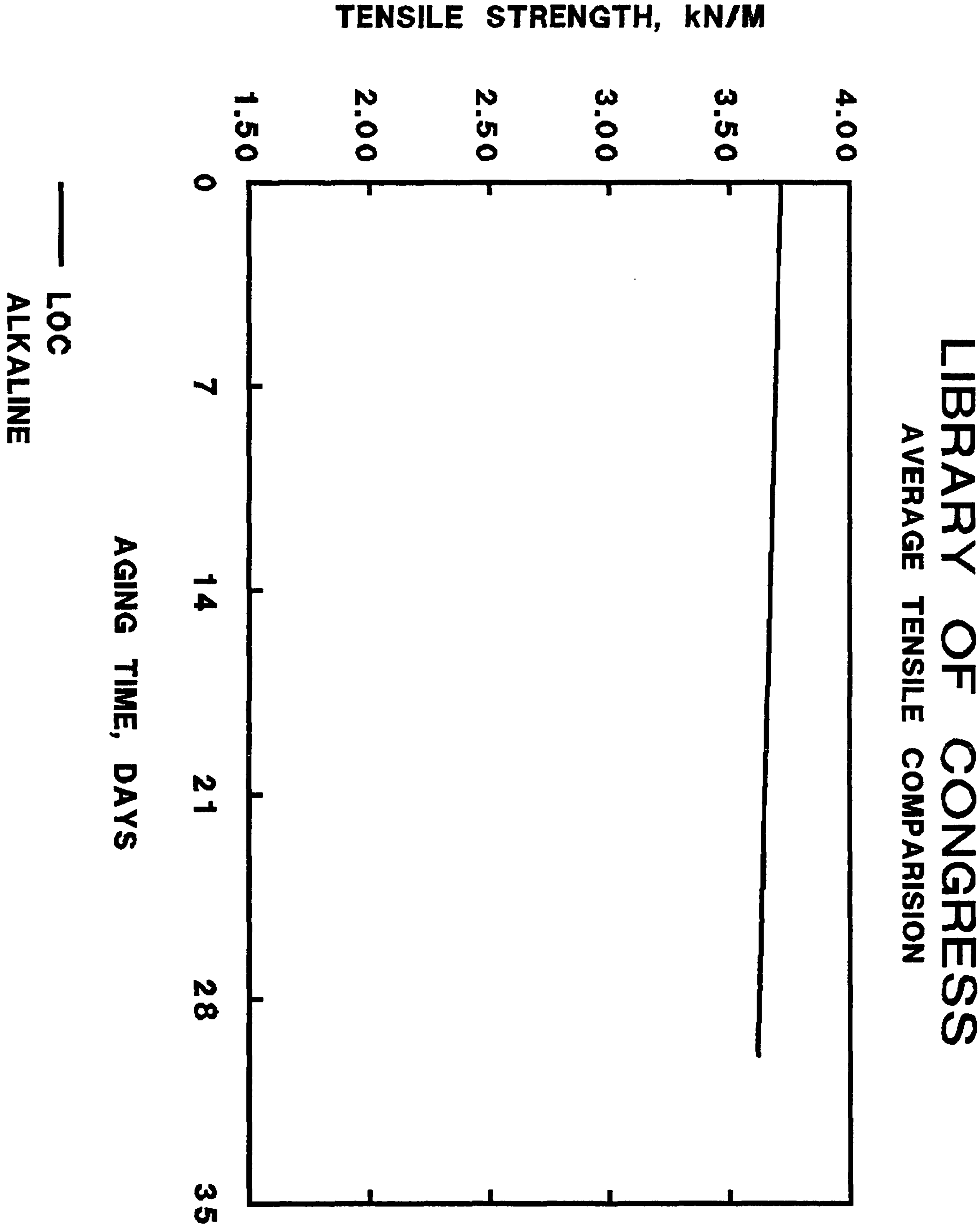
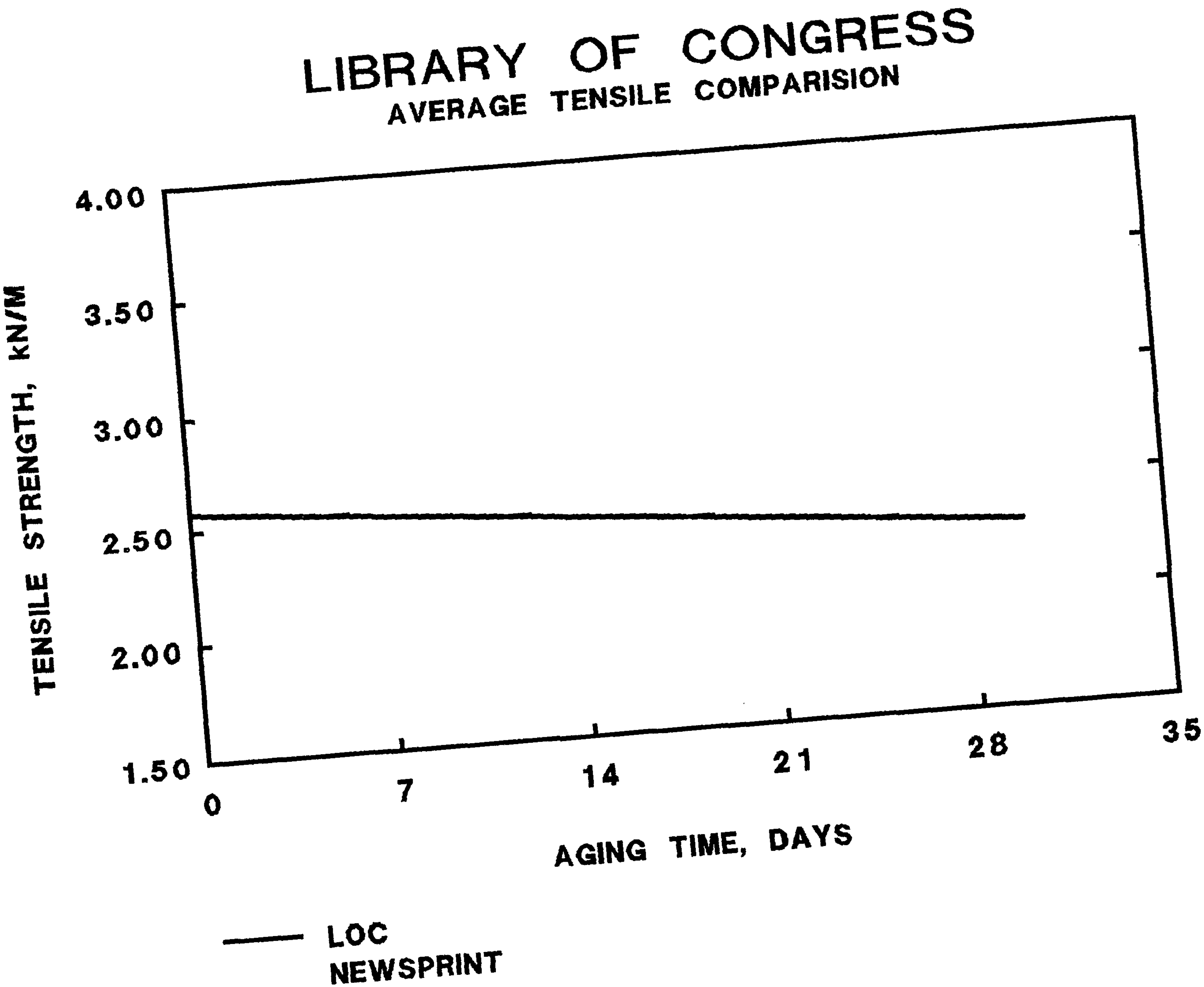
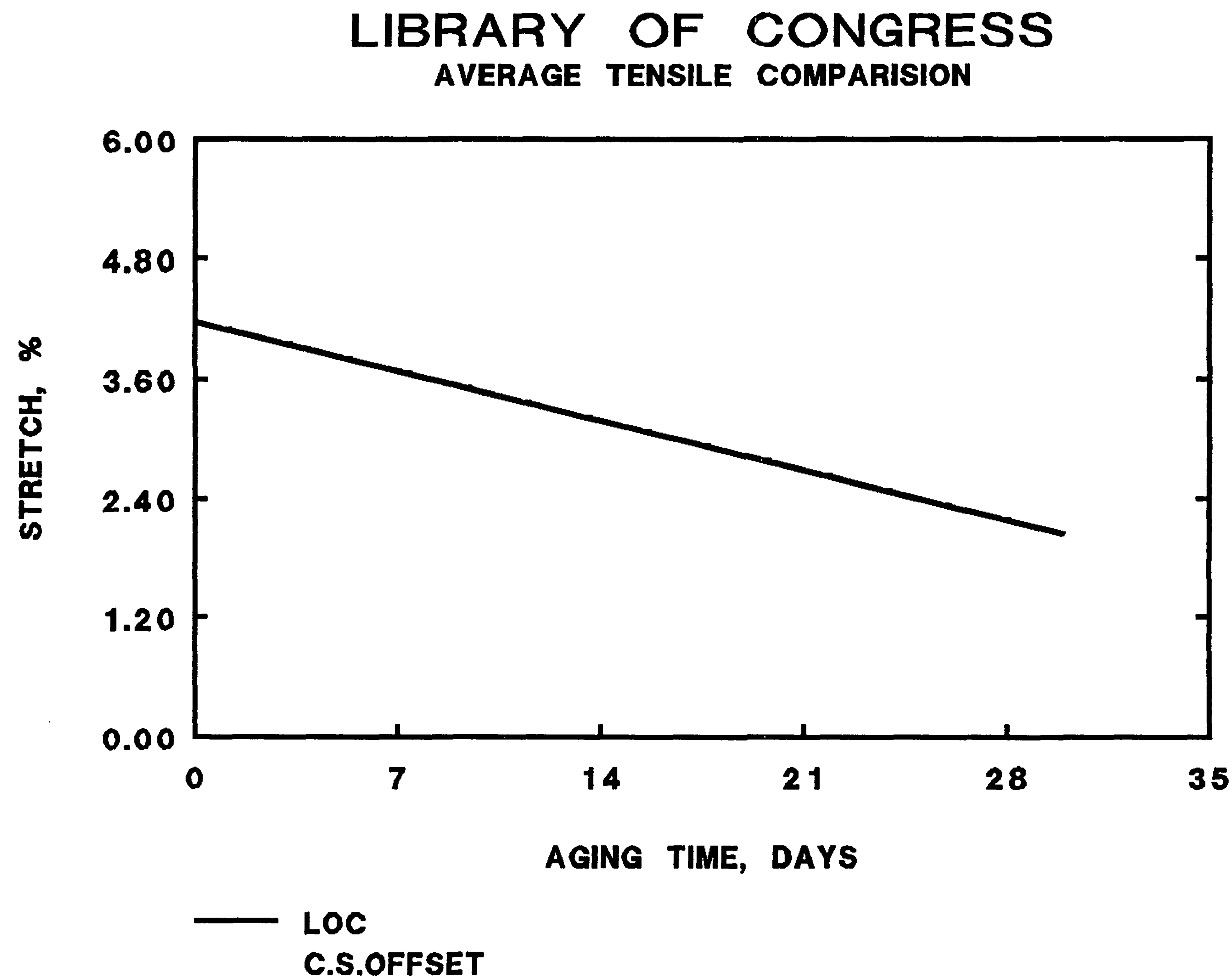

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALKALINE

FIGURE-12



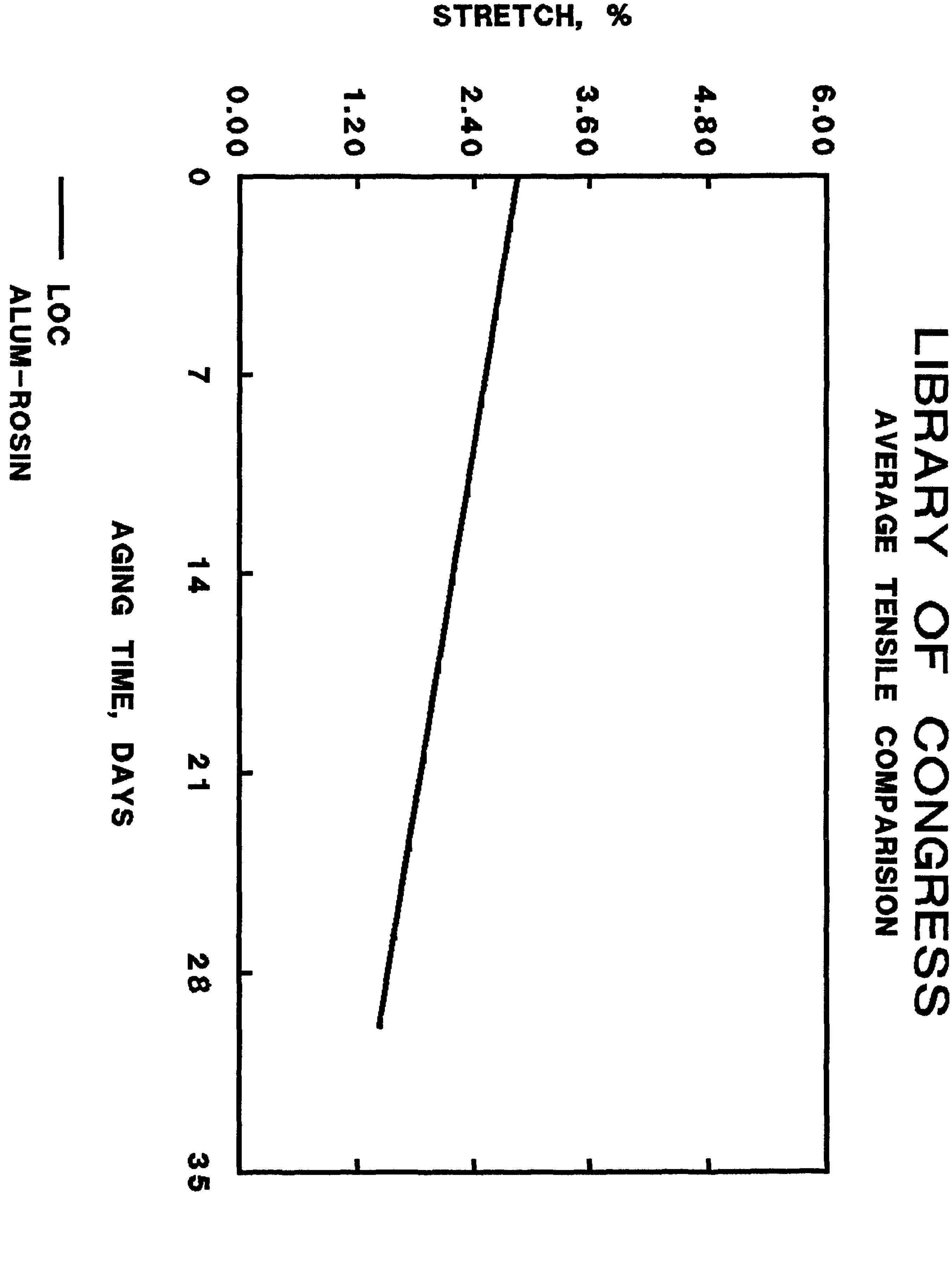
LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
LOC
NEWSPRINT

FIGURE-13



LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
STRETCH, %
6.00
4.80
3.60
2.40
1.20
0.00
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-14



LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
STRETCH, %
0.00
1.20
2.40
3.60
4.80
6.00
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-15

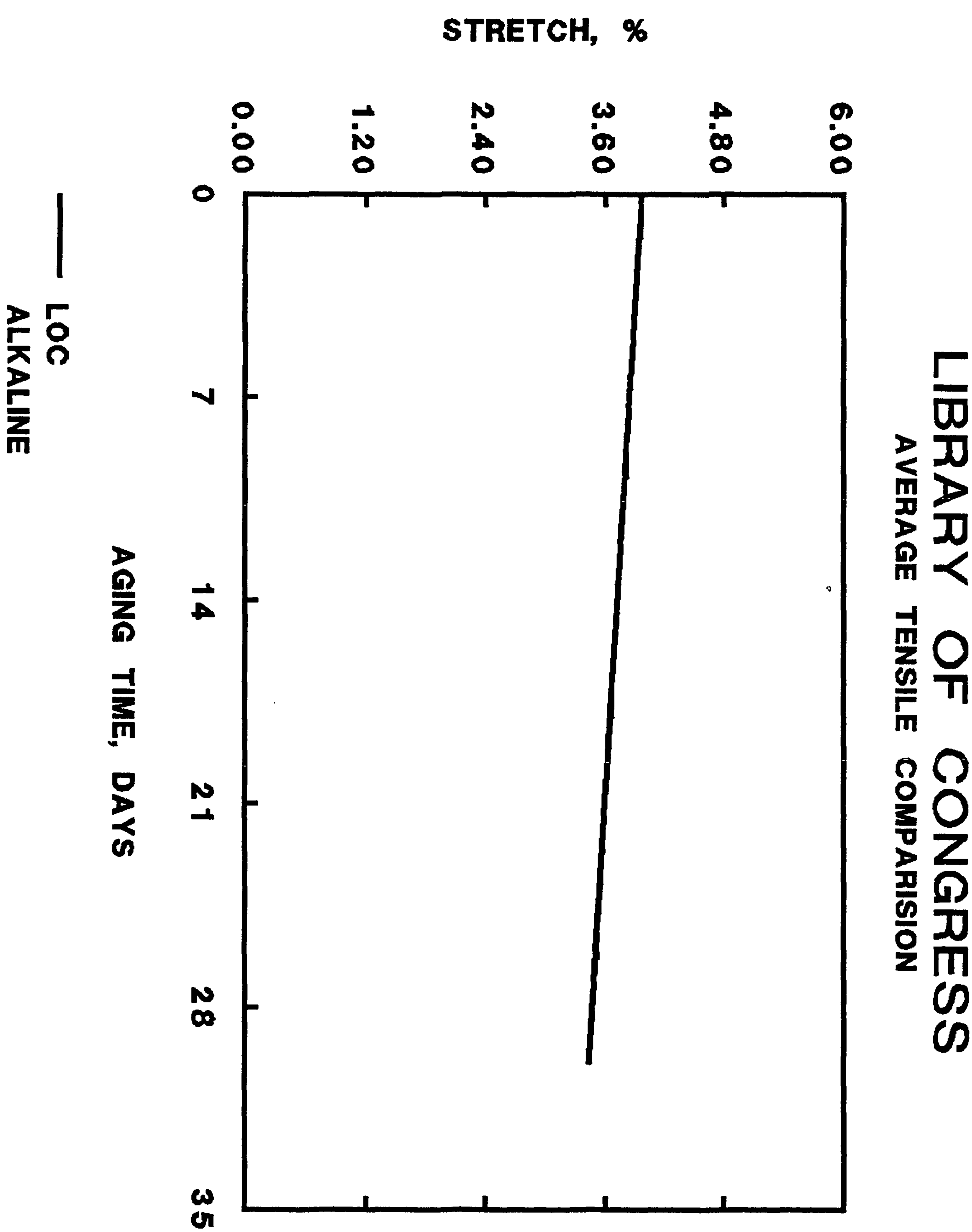

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
STRETCH, %
0.00
1.20
2.40
3.60
4.80
6.00
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALKALINE

FIGURE-16

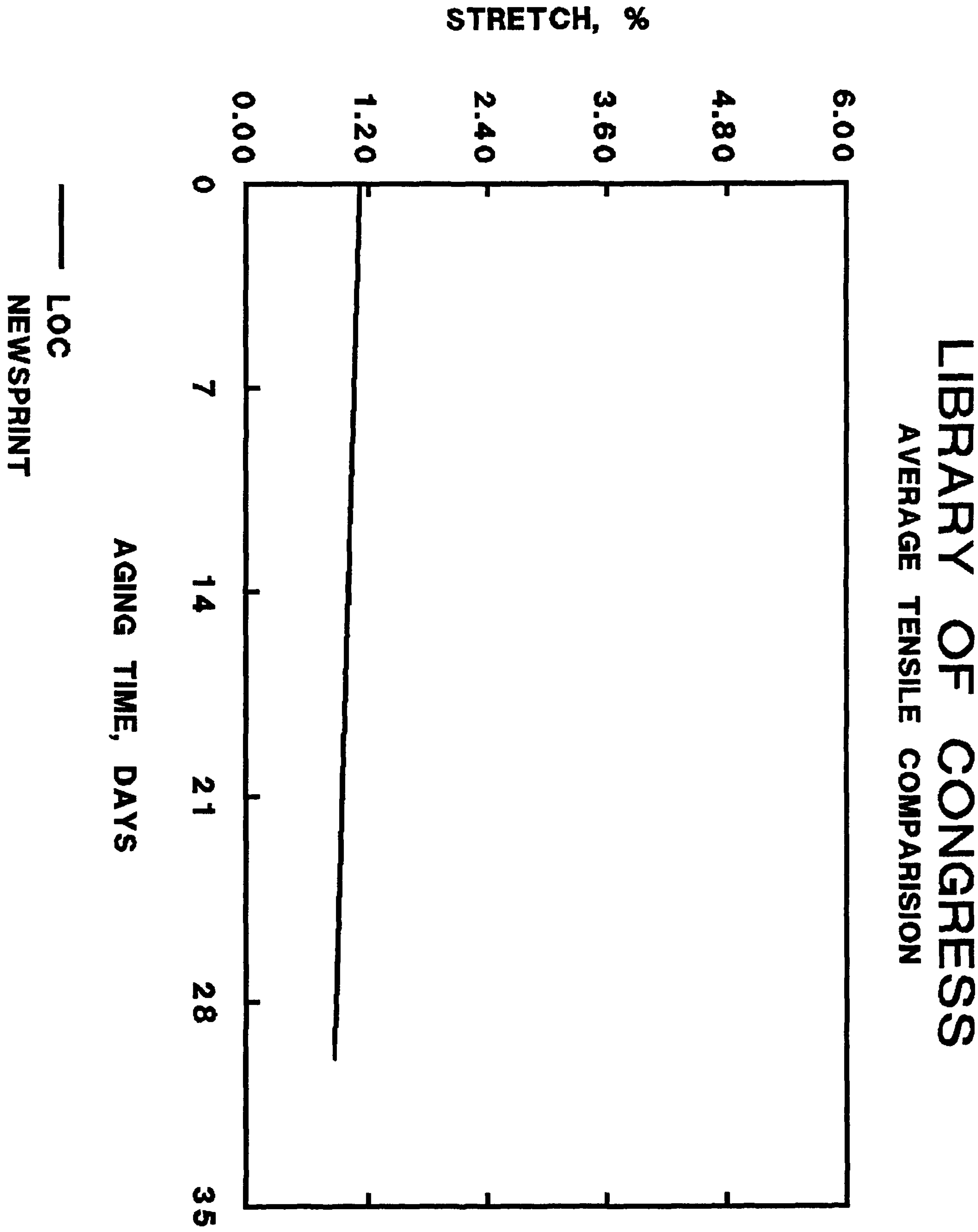

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
STRETCH, %
0.00
1.20
2.40
3.60
4.80
6.00
0
7
14
21
28
35
AGING TIME, DAYS
LOC
NEWSPRINT

FIGURE-17

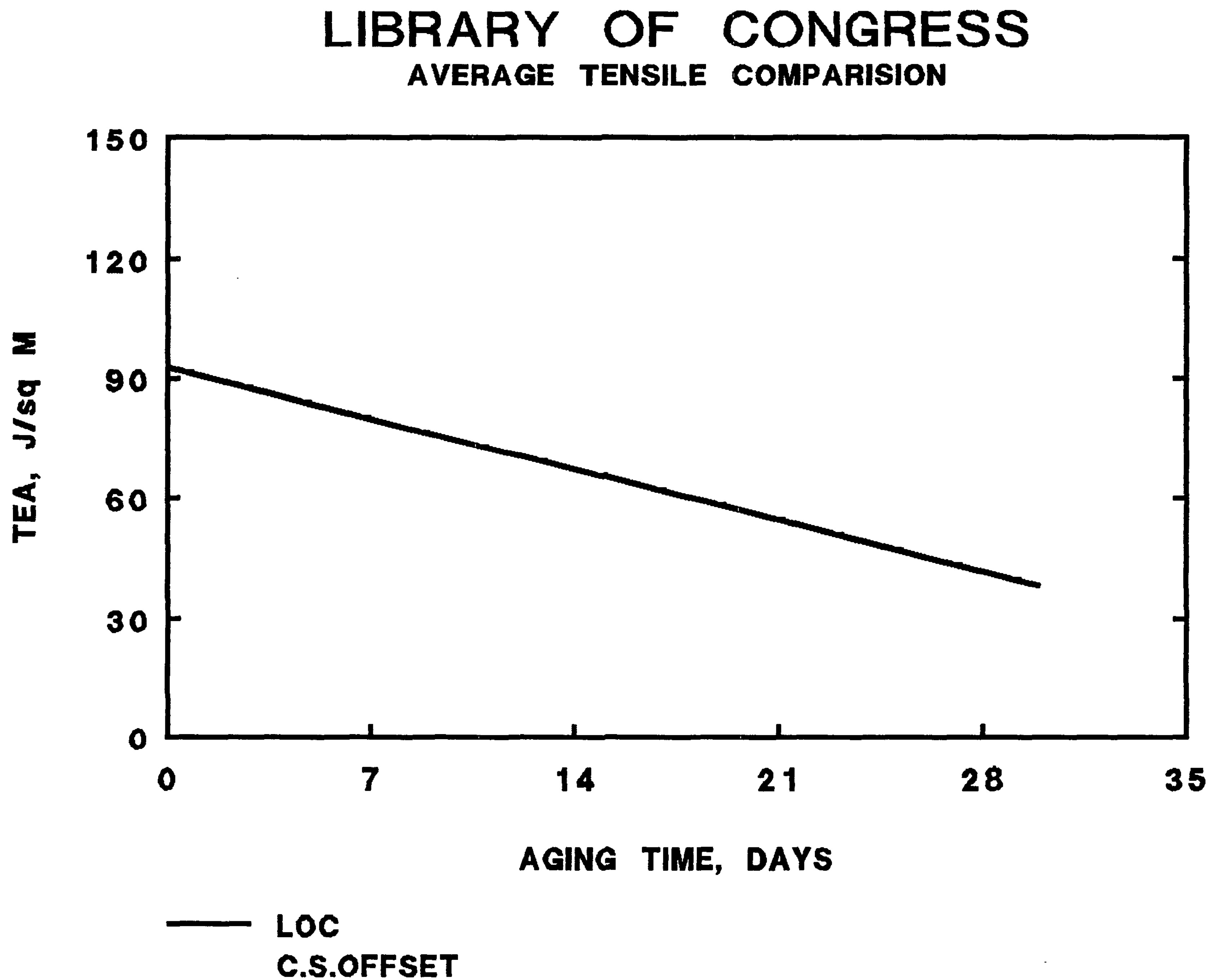

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TEA, J/sq M
150
120
90
60
30
0
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-18

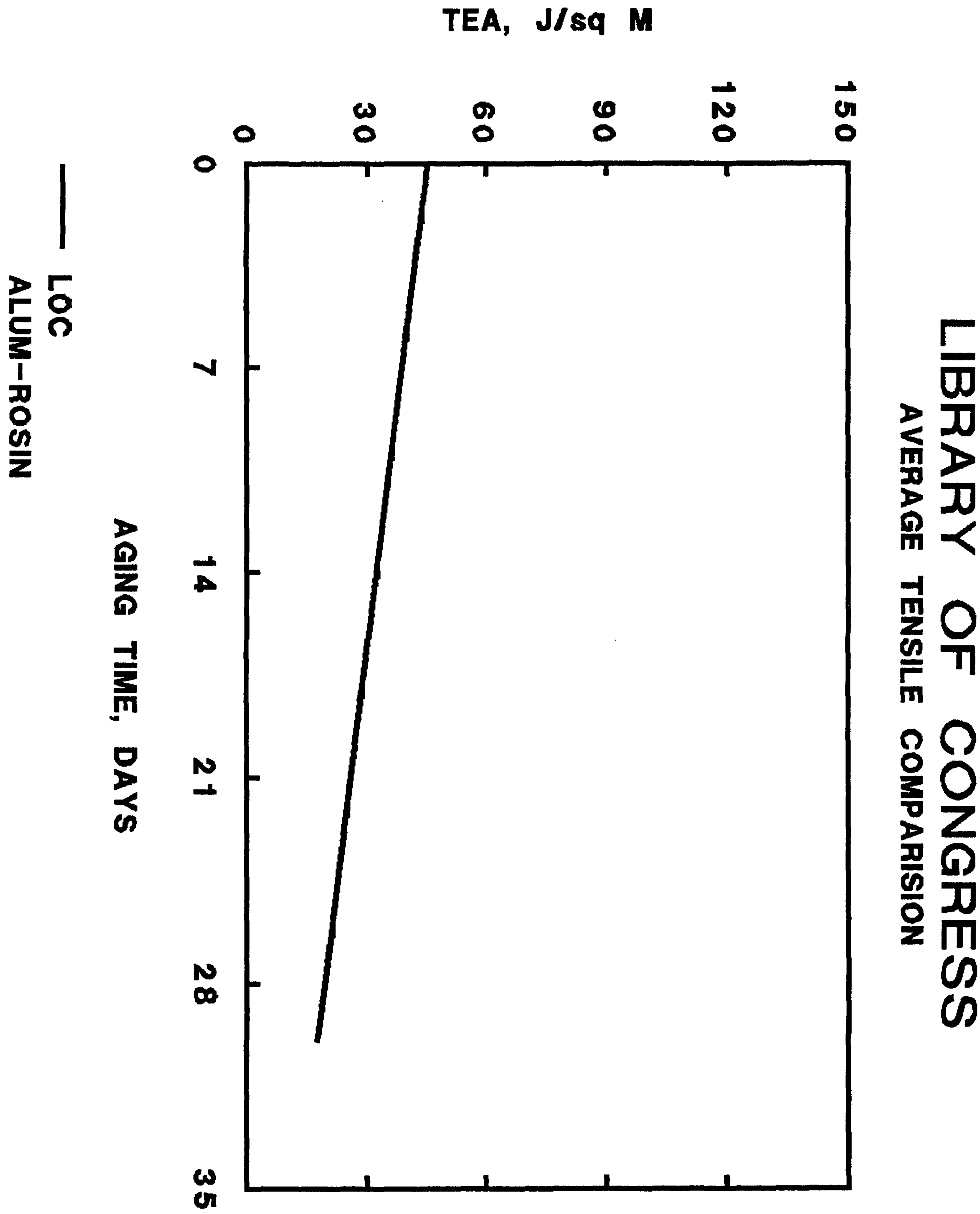

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TEA, J/sq M
150
120
90
60
30
0
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-19

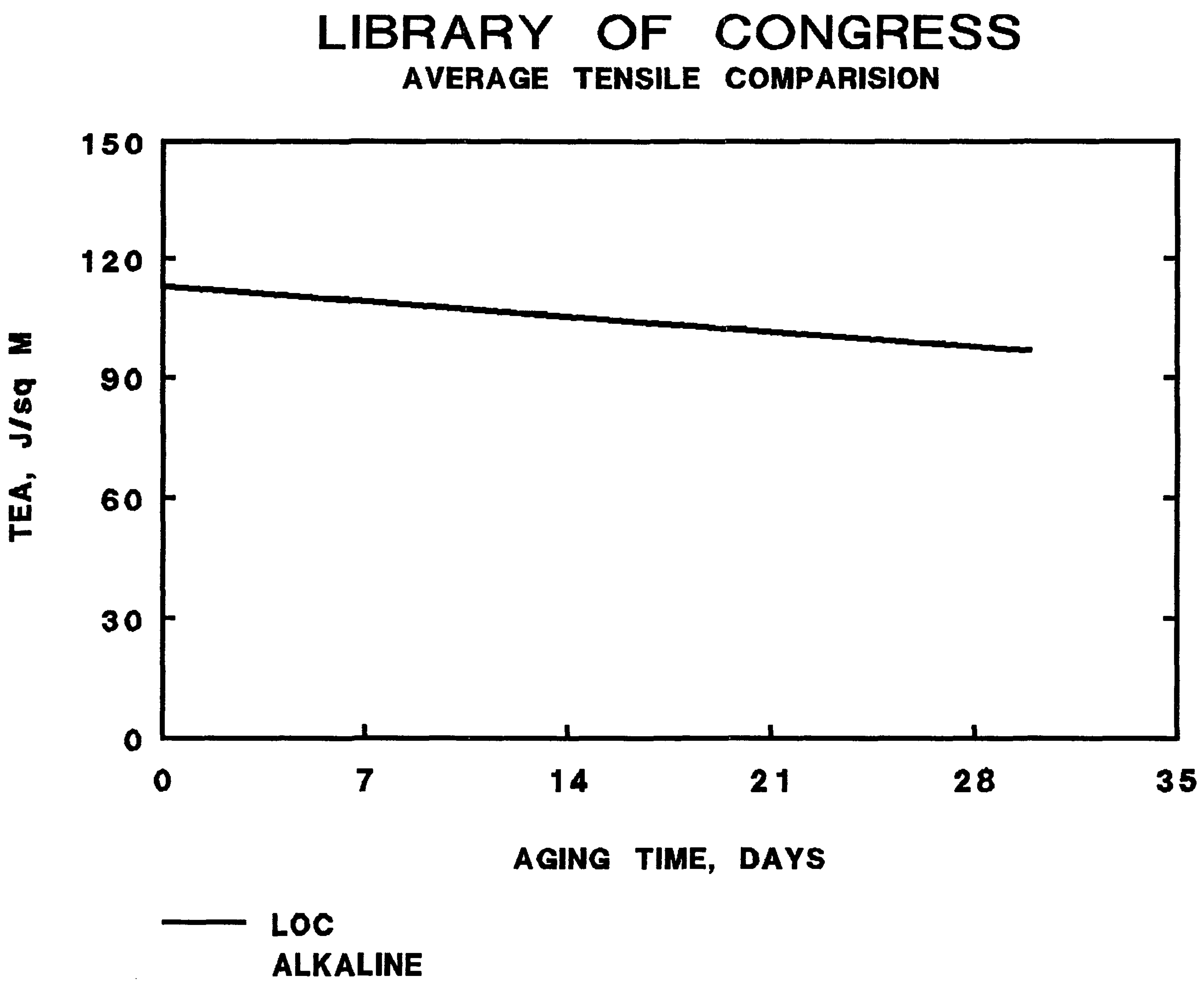

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TEA, J/sq M
150
120
90
60
30
0
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALKALINE

FIGURE-20

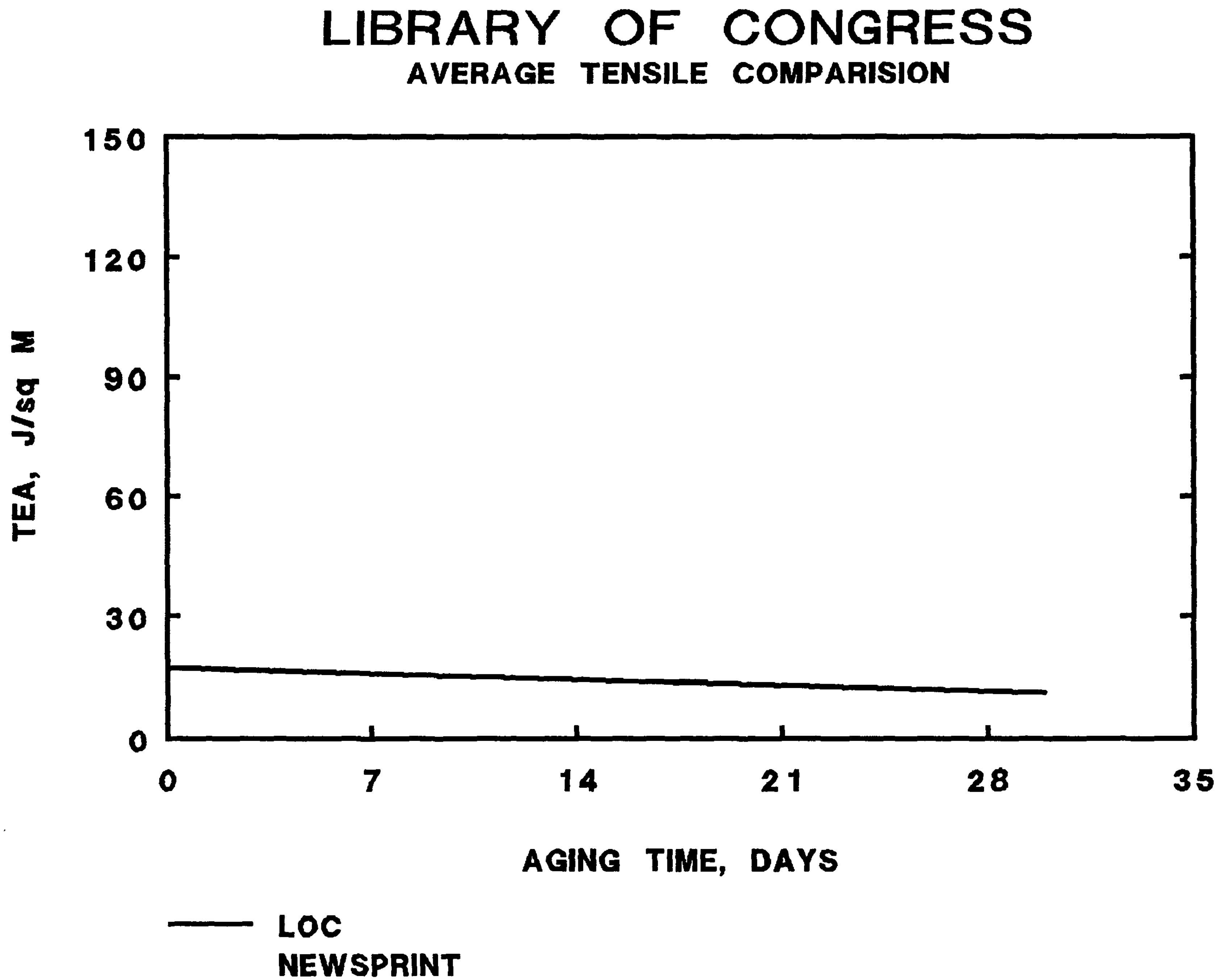

LIBRARY OF CONGRESS
AVERAGE TENSILE COMPARISION
TEA, J/sq M
150
120
90
60
30
0
0
7
14
21
28
35
AGING TIME, DAYS
LOC
NEWSPRINT

FIGURE-21

Brightness - The results of brightness tests for unaged samples, and for samples aged 3, 6, 9, 12, 18, 24, and 30 days are given starting on page A-219 of the appendix. Following the tabulation of data are 12 plots of log fold against time of aging. Each plot represents data for 1 of 4 book parts (G, H, K, or M) of the 3 books used for this testing. Two sheets were tested for each aging interval, and the results for each sheet are shown separately in the plots. Error limits (+/- 1 standard deviation) are shown for each data point. In some cases, the error limits were smaller than the symbols used for plotting and, hence, are not shown.

All of the data for each book part, and for each aging period, were averaged together. The regression lines for the grouped data are shown in Figs. 22-25 for the 4 book parts, respectively. Similar regression lines for the treated sets are shown in Reports 1, 2, and 3.

The decay rate per day in % brightness for the treated samples, and for the untreated control is given below.

Brightness Degradation Rate

Book Part	Treated Samples			Untreated
	Demo 1	Demo 2	Demo 3	Control
Clear Spring Offset (G)	0.51	0.49	0.38	0.51
Alum-rosin sized paper (H)	0.50	0.54	0.50	0.60
Alkaline sized paper (K)	0.31	0.38	0.27	0.45
Newsprint (M)	0.35	0.45	0.43	0.46

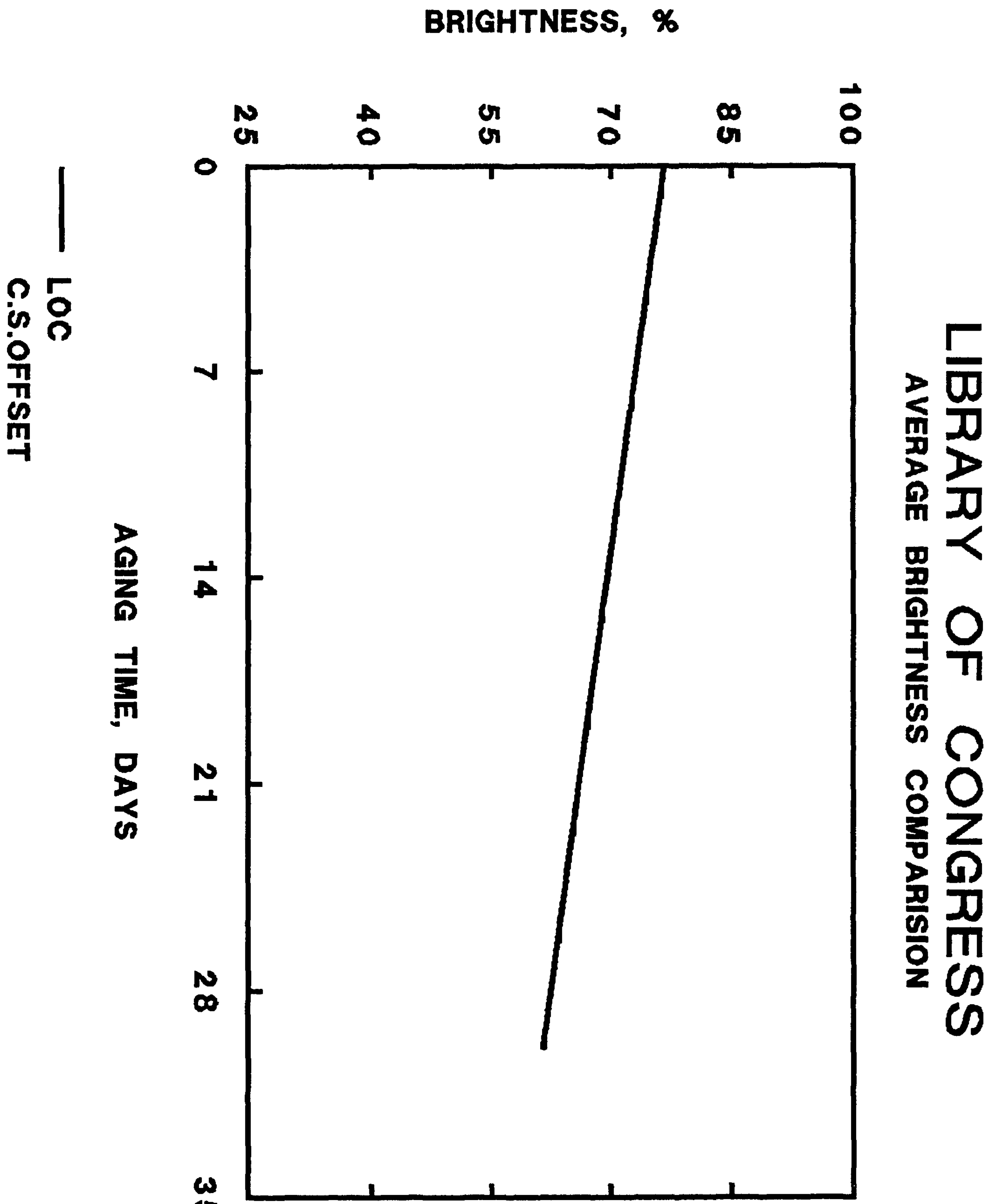

LIBRARY OF CONGRESS
AVERAGE BRIGHTNESS COMPARISION
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-22

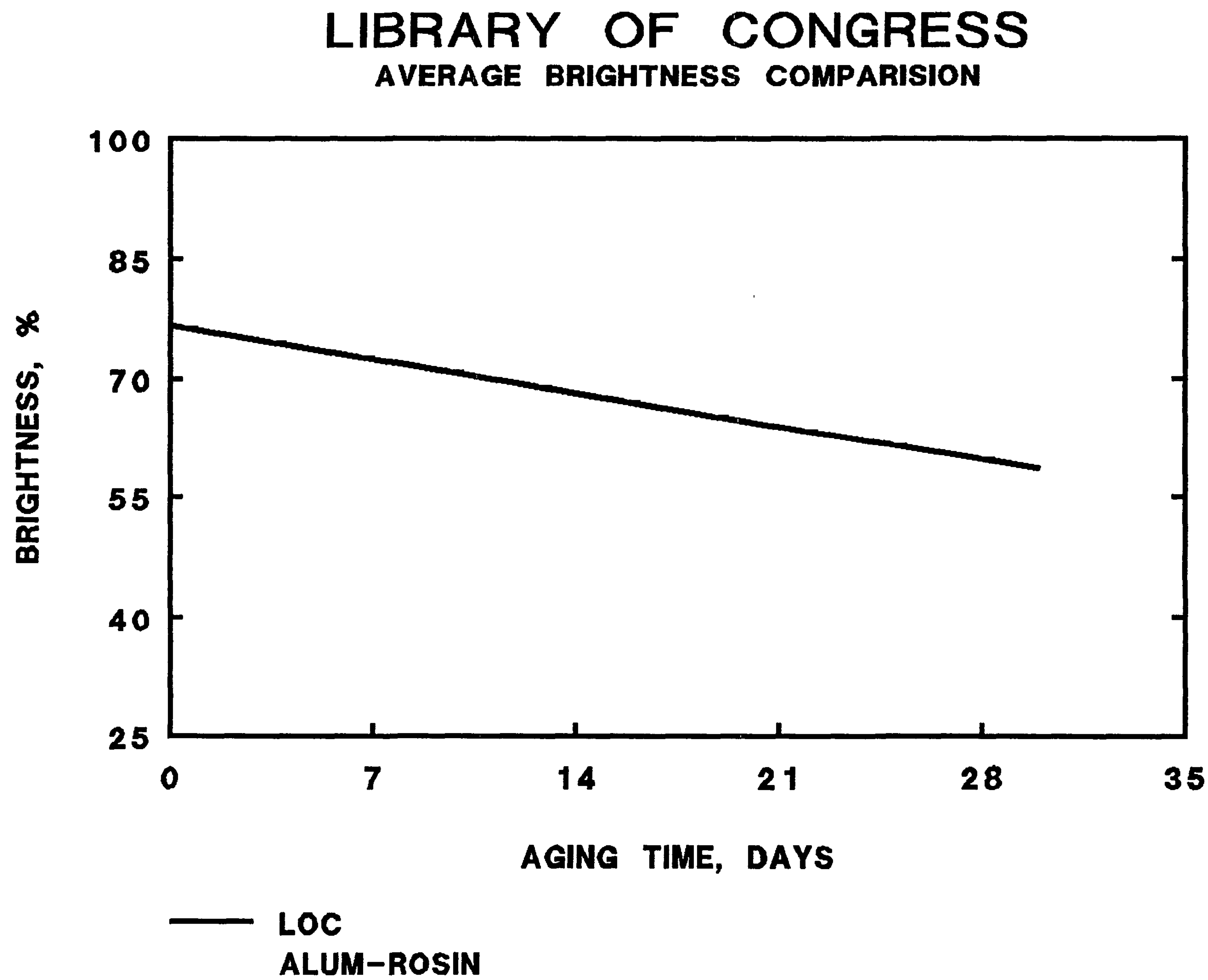

LIBRARY OF CONGRESS
AVERAGE BRIGHTNESS COMPARISION
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-23

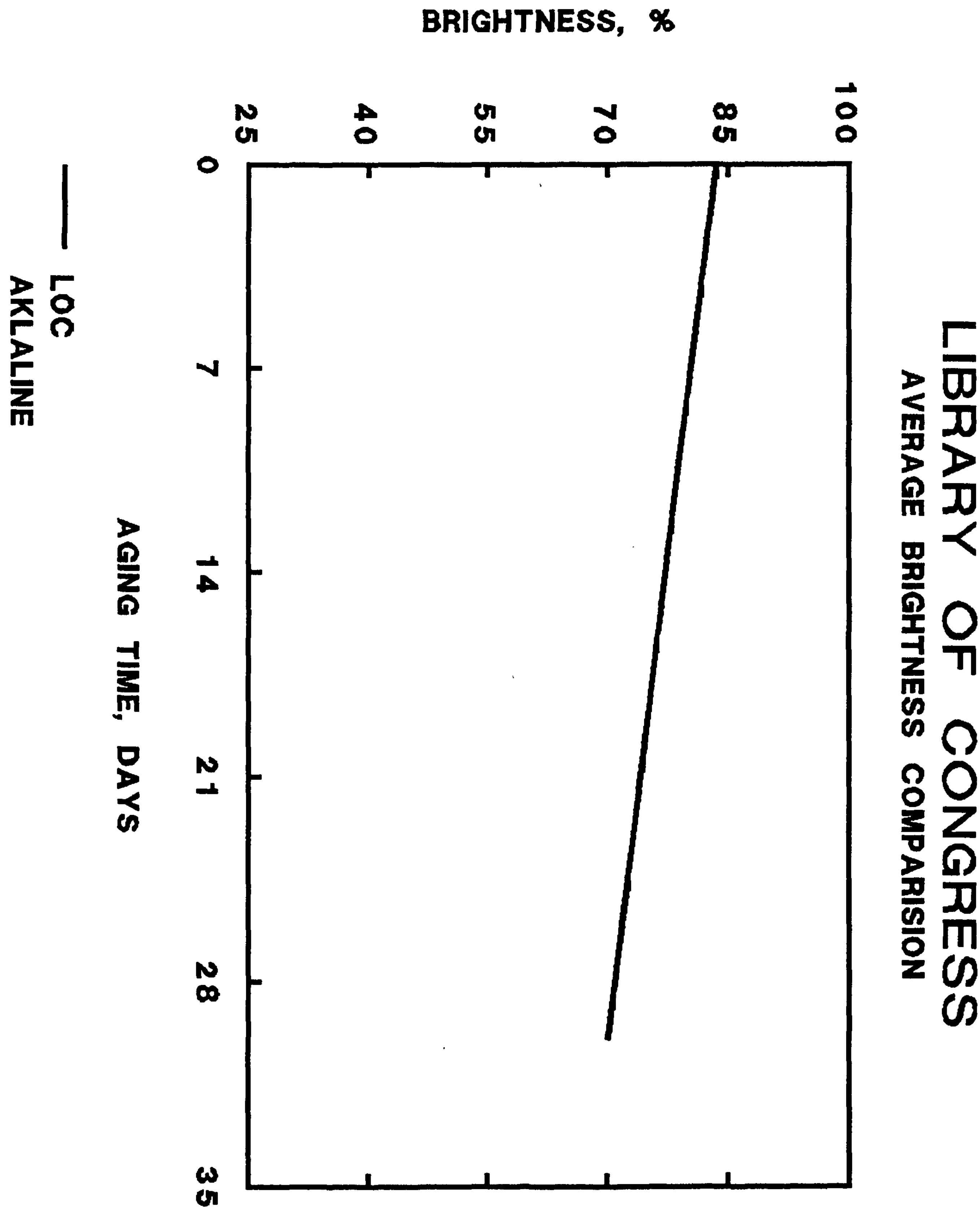

LIBRARY OF CONGRESS
AVERAGE BRIGHTNESS COMPARISION
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
LOC
AKLALINE

FIGURE-24

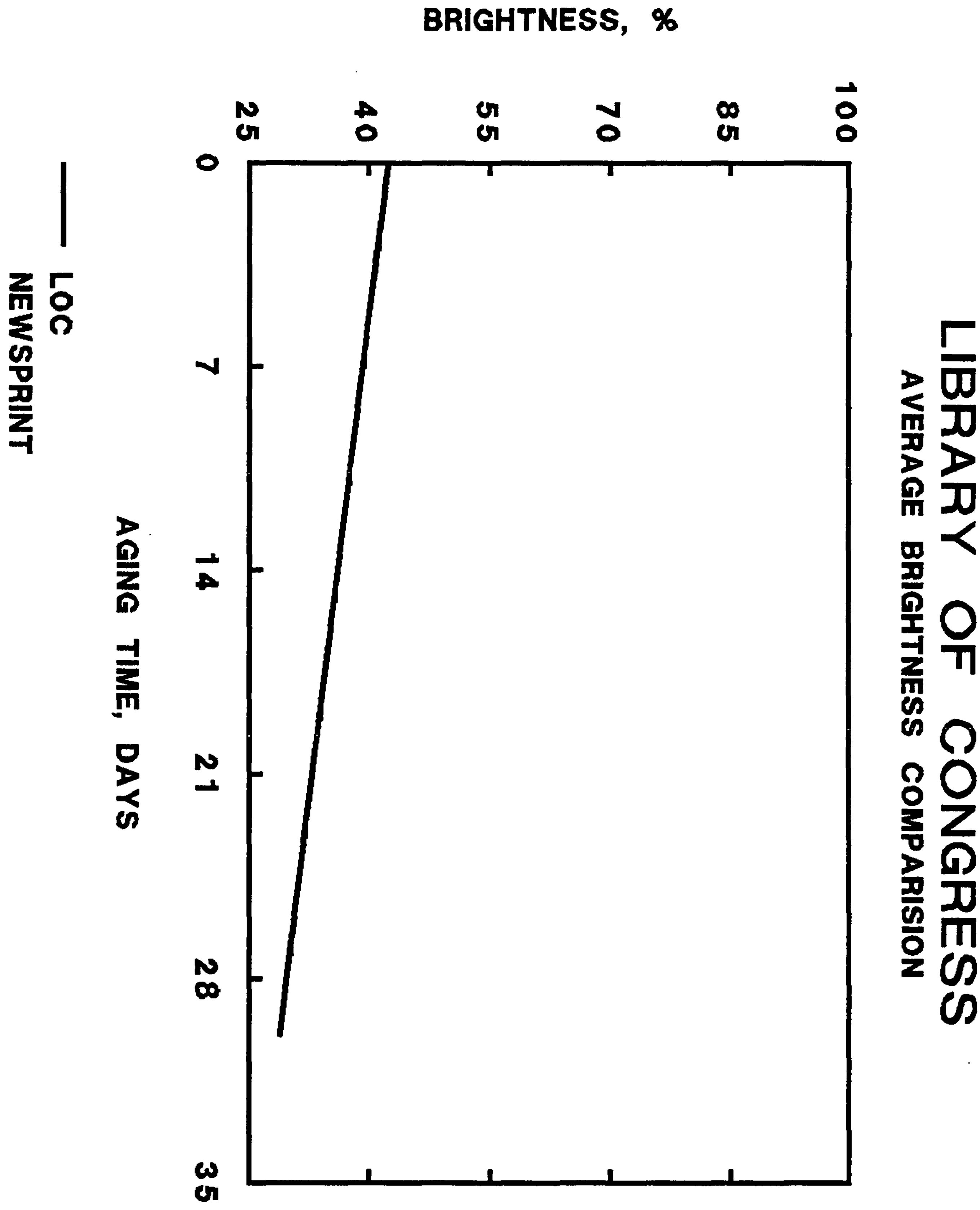
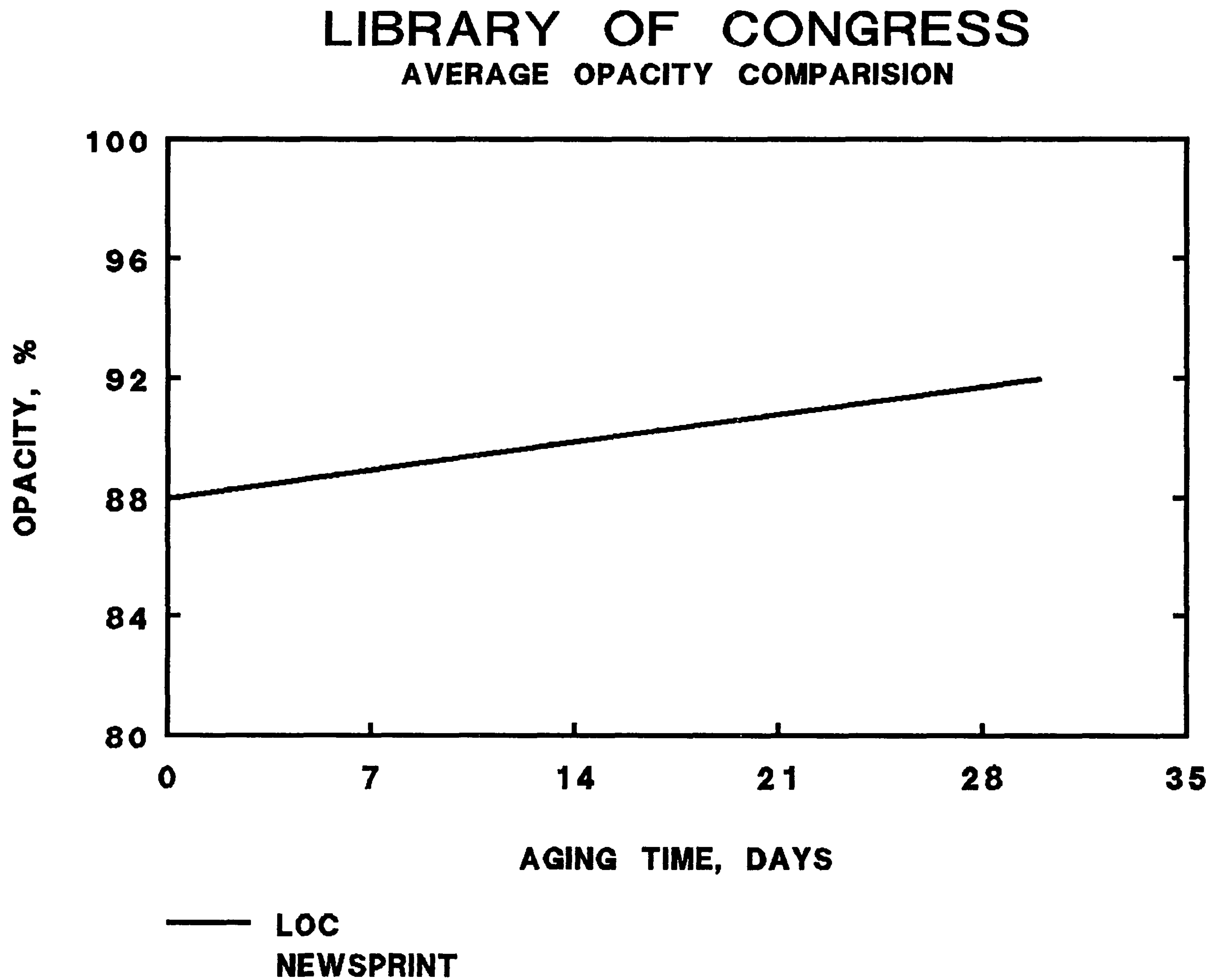

LIBRARY OF CONGRESS
AVERAGE BRIGHTNESS COMPARISION
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
LOC
NEWSPRINT

FIGURE-25

Opacity - The results of opacity tests for unaged samples, and for samples aged 30 days, are given starting on page A-279 of the appendix. Following the tabulation of data are 12 plots of opacity against time of aging. Each plot represents data for 1 of 4 book parts (G, H, K, or M) of the 3 books used for this testing. Two sheets were tested for each aging interval, and the results for each sheet are shown separately in the plots. Error limits (+/- 1 standard deviation) are shown for each data point.

All of the data for each book part, and for each aging period, were averaged together. The regression lines for the grouped data are shown in Figs. 26-29 for the 4 book parts, respectively. Similar regression lines for the treated sets are shown in Reports 1, 2, and 3.



LIBRARY OF CONGRESS
AVERAGE OPACITY COMPARISION
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
LOC
NEWSPRINT

FIGURE-26

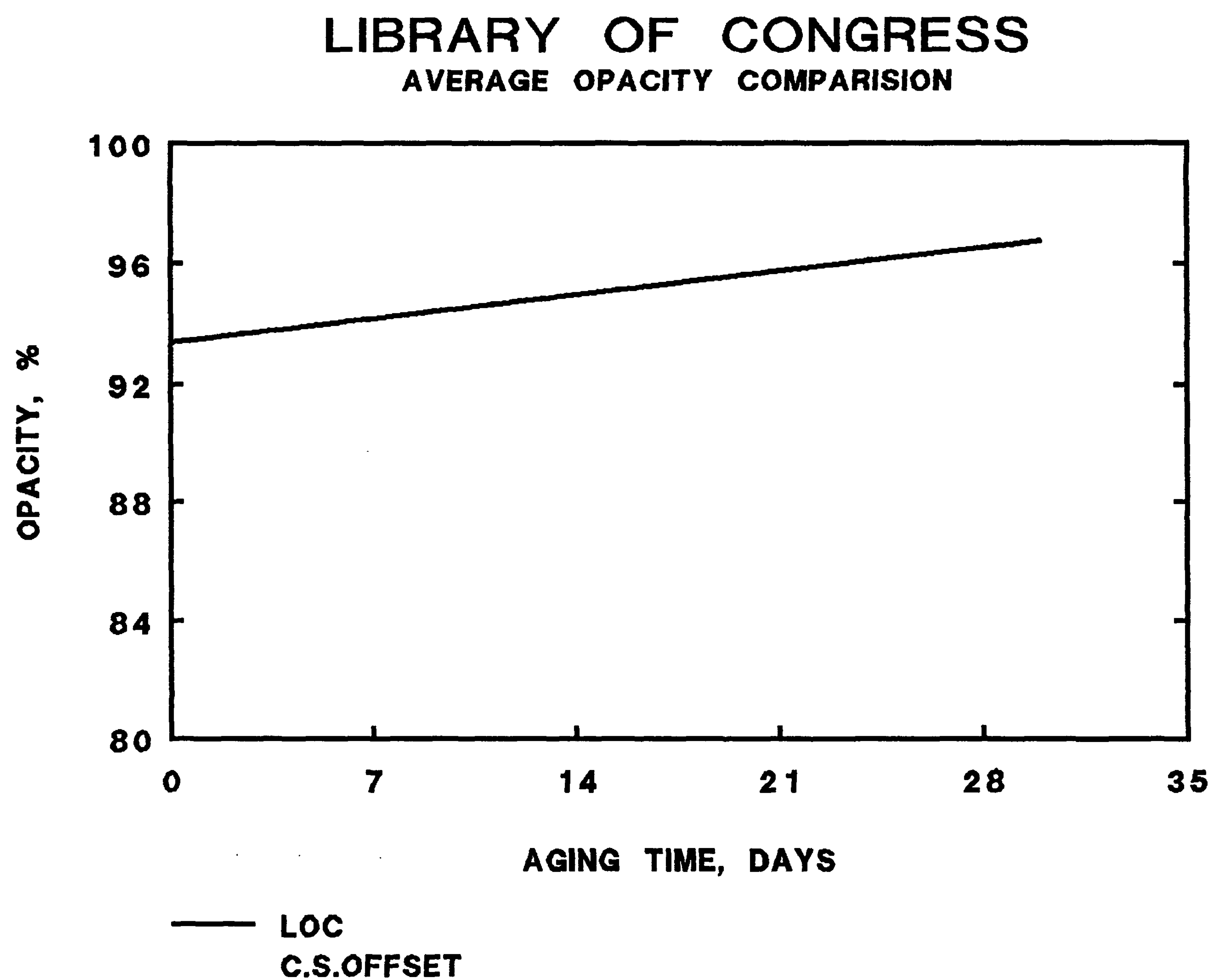

LIBRARY OF CONGRESS
AVERAGE OPACITY COMPARISION
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
LOC
C.S.OFFSET

FIGURE-27

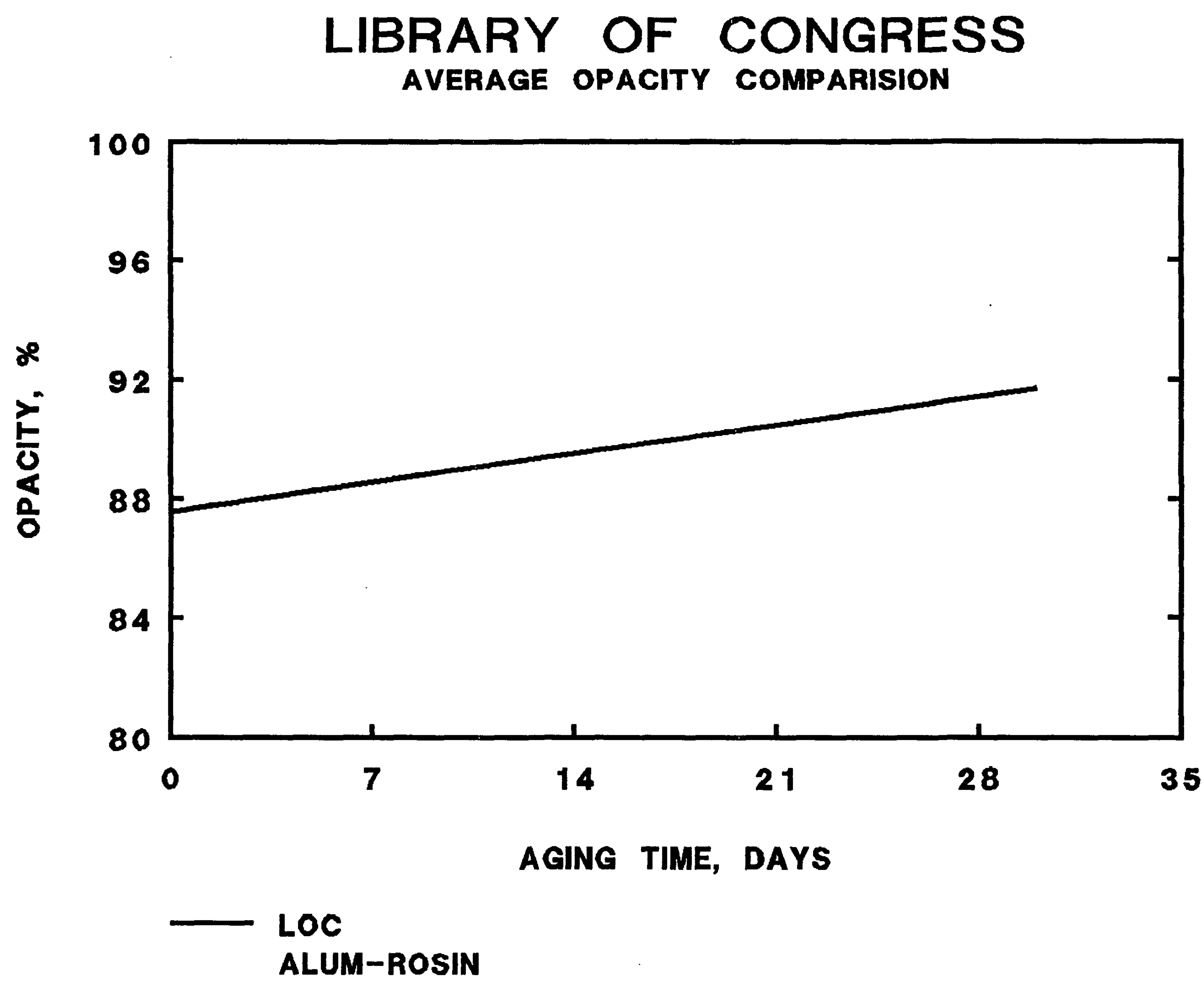

LIBRARY OF CONGRESS
AVERAGE OPACITY COMPARISION
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
LOC
ALUM-ROSIN

FIGURE-28

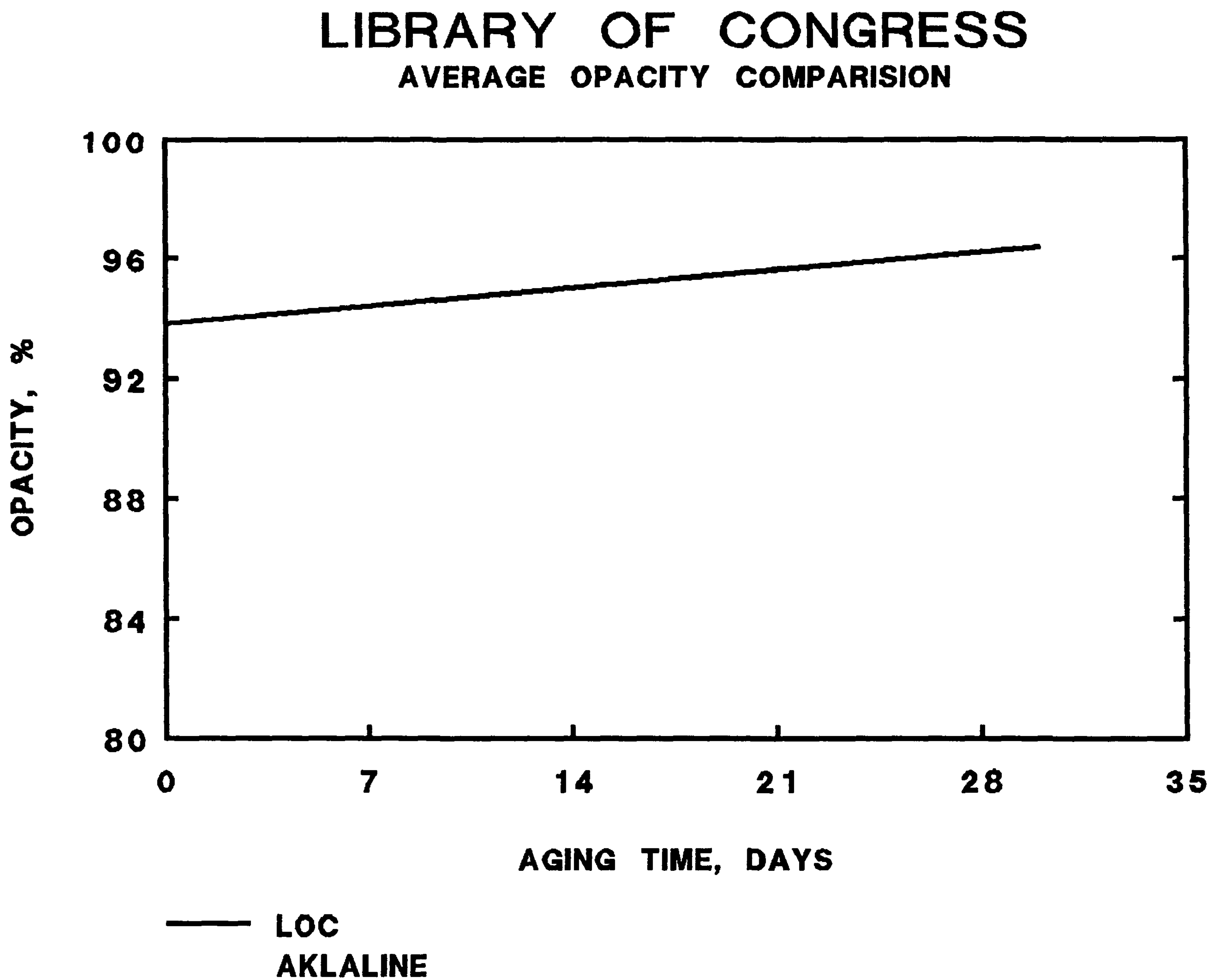

LIBRARY OF CONGRESS
AVERAGE OPACITY COMPARISION
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
LOC
AKLALINE

FIGURE-29

Alkali Solubility - The results of alkali solubility tests for unaged samples, and for samples aged 3, 6, 9, 12, 18, 24, and 30 days are given starting on page A-303 of the appendix. Following the tabulation of data are 4 plots of solubility against time of aging. Each plot represents data for 1 of 4 book parts (G, H, K, or M) of the 2 books used for this testing. The results for each of the two books are shown separately on the same plots. Error limits are not shown for this test since only two measurements were made for each test variable.

Retention of Alkaline Reserve - The results of alkaline reserve tests for unaged samples, and for samples aged 3, 6, 9, 12, 18, 24, and 30 days are given starting on page A-315 of the appendix. Following the tabulation of data are 3 plots of alkaline reserve against time of aging. Each plot represents data for 1 of 3 book parts (G, H, or M) of the 2 books used for this testing. The results for each of the two books are shown separately on the same plots. Error limits are not shown for this test since only two measurements were made for each test variable.

LIBRARY OF CONGRESS

MOISTURE CONTENT DATA

Whole Book Data

Test Number	Control Number	Moisture %
1	301491	5.96
2	101146	6.24
3	303993	4.49
4	100974	5.53
5	301376	5.63
6	301819	6.20
7	101585	5.78
8	302010	6.30
9	302791	4.23
10	101070	5.26
Average		5.56
Std. Dev.		0.718

Individual Pages Data

Test Number	Control Number	Page Number	Moisture %
1	101283	5	5.75
2	100786	15	4.60
3	301650	1	5.82
4	302731	5	4.72
5	101283	19	5.78
6	100786	117	4.55
7	301650	17	5.89
8	302731	121	5.00
9	101283	219	4.82
10	100786	310	3.42
11	301650	63	5.92
12	302731	317	4.66
13	101283	317	4.79
14	100786	419	3.45
15	301650	65	5.94
16	302731	497	4.73
Average			4.99
Std. Dev.			0.815

LIBRARY OF CONGRESS

ODOR EVALUATION – WHOLE BOOK

PANELIST A

CONTROL #	None	Threshold	Slight	Moderate	Strong
302024				X	
304058				X	
303784			X		
301981		X			
302303		X			
303176		X			
100619		X			
300679		X			
101598		X			
302842		X			
300735		X			
303331		X			
101028		X			
302002		X			
301990		X			
303613		X			
100913	X				
100130	X				
300532	X				
303827	X				
100714	X				
101302	X				
302442	X				
100324	X				
303511	X				

* The books were not evaluated in the order listed.

LIBRARY OF CONGRESS

ODOR EVALUATION – WHOLE BOOK

PANELIST C

CONTROL #	None	Threshold	Slight	Moderate	Strong
302024	X				
304058				X	
303784	X				
301981		X			
302303	X				
303176		X			
100619	X				
300679			X		
101598	X				
302842	X				
300735		X			
303331			X		
101028	X				
302002		X			
301990	X				
303613	X				
100913	X				
100130	X				
300532	X				
303827	X				
100714			X		
101302	X				
302442	X				
100324	X				
303511			X		

LIBRARY OF CONGRESS

ODOR EVALUATION – WHOLE BOOK

PANELIST D

CONTROL #	None	Threshold	Slight	Moderate	Strong
302024		X			
304058		X			
303784	X				
301981	X				
302303		X			
303176	X				
100619	X				
300679	X				
101598	X				
302842	X				
300735	X				
303331			X		
101028	X				
302002	X				
301990	X				
303613	X				
100913	X				
100130		X			
300532	X				
303827	X				
100714	X				
101302	X				
302442	X				
100324		X			
303511	X				

LIBRARY OF CONGRESS

ODOR EVALUATION – WHOLE BOOK

PANELIST F

CONTROL #	None	Threshold	Slight	Moderate	Strong
302024	X				
304058	X				
303784	X				
301981	X				
302303	X				
303176	X				
100619	X				
300679		X			
101598	X				
302842	X				
300735		X			
303331	X				
101028	X				
302002		X			
301990	X				
303613		X			
100913	X				
100130	X				
300532	X				
303827	X				
100714	X				
101302	X				
302442	X				
100324	X				
303511	X				

LIBRARY OF CONGRESS

TEMPERATURE EXPOSURE DATA

Sensor Control Number	Book Link Number	Maximum Indicated Temperature 120–180 Sensor		160–220 Sensor	
		Location	Temp, F	Location	Temp, F
400391/392	301493	4	<120	4	<160
400393/394	300969	1	<120	1	<160
400395/396	300451	2	<120	2	<160
400505/506	300534	1	<120	1	<160
400507/508	304051	4	<120	4	<160
400509/510	100217	1	<120	1	<160
400511/512	101214	2	<120	2	<160
400513/514	100471	1	<120	1	<160
400515/516	301983	3	<120	3	<160
400517/518	100398	2	<120	2	<160
400519/520	100105	1	<120	1	<160
400521/522	100488	2	<120	2	<160
400523/524	100766	1	<120	1	<160
400525/526	20098B	1	<120	1	<160
400527/528	101709	2	<120	2	<160
400529/530	303260	4	<120	4	<160

Location of Sensor

1 = Front cover

2 = Back cover

3 = Spine

4 = Insert

LIBRARY OF CONGRESS

EVALUATION OF ATTACHED FILTER PAPERS

CONTROL #	LINK #	FILTER LOCATION			BLEEDING/LEACHING
		COVER	COLOR/BW ILLUSTRATION	PRINTED TEXT	%
400842	101585	X			1%
400841	101585		X		1%
400860	301621	X			4%
400861	301621			X	2%
400093	100743			X	5%
400092	100743	X			5%
400053	100324		X		3%
400052	100324	X			3%
400193	101176			X	2%
400846	301791	X			7%
400192	101176	X			3%
400858	100254	X			3%
400847	100286			X	2%
400851	100511		X		3%
400850	100511	X			4%
400845	303539			X	3%
400173	100135		X		4%
400172	100135	X			5%
400846	303539	X			5%
400857	301986			X	2%
400856	301986	X			6%
400213	100843		X		3%
400212	100843	X			4%
400227	101237			X	2%
400232	101237	X			4%
400113	100352			X	2%
400112	100352	X			2%

LIBRARY OF CONGRESS

EVALUATION OF ATTACHED FILTER PAPERS

CONTROL #	LINK #	FILTER LOCATION COVER	FILTER LOCATION COLOR/BW ILLUSTRATION	FILTER LOCATION PRINTED TEXT	BLEEDING/LEACHING %
400859	100254		X		2%
400849	100286	X			3%
400853	101465			X	1%
400852	101465	X			3%
400843	301791		X		4%

LIBRARY OF CONGRESS

COLD EXTRACT pH DATA

	Control Number	Sheet Number	Cold Extract pH Specimen 1	Cold Extract pH Specimen 2
Non-Test Book	302705	1	4.6	5.1
		2	4.6	4.8
		3	4.4	4.7
		4	4.5	4.8
		5	5.0	4.7
Non-Test Book	302590	1	4.5	4.8
		2	4.5	5.2
		3	5.0	5.2
		4	5.0	5.1
		5	4.7	5.1
Non-Test Book	302655	1	5.7	5.8
		2	5.7	5.7
		3	5.8	5.7
		4	5.7	5.9
		5	5.8	5.8
Non-Test Book	100105	1	9.1	9.3
		2	9.1	9.3
		3	9.2	9.3
		4	9.2	9.3
		5	9.2	9.3

LIBRARY OF CONGRESS

COLD EXTRACT pH DATA

	Control Number	Sheet Number	Cold Extract pH Specimen 1	Cold Extract pH Specimen 2
Non–Test Book	302809	1	9.6	9.4
		2	9.6	9.6
		3	9.4	9.6
		4	9.5	9.6
		5	9.6	9.6
Non–Test Book	301653	1	5.6	5.6
		2	5.6	5.7
		3	5.6	5.7
		4	5.6	5.7
		5	5.6	5.7
Half–Book	20006B	1	9.2	9.2
		2	9.2	9.4
		3	9.1	9.4
		4	9.2	9.3
		5	9.3	9.3
Half–Book	20042B	1	4.7	4.7
		2	4.7	4.7
		3	4.7	4.7
		4	4.7	4.7
		5	4.7	4.7

LIBRARY OF CONGRESS

COLD EXTRACT pH DATA

	Control Number	Sheet Number	Cold Extract pH Specimen 1	Cold Extract pH Specimen 2
Half-Book	20144B	1	5.0	4.8
		2	5.0	4.5
		3	4.6	4.5
		4	4.6	9.0
		5	4.8	8.9
Test-Book Part G	304010	1	5.8	5.4
		2	5.7	5.5
		3	5.7	5.5
		4	5.7	5.5
		5	5.7	5.5

LIBRARY OF CONGRESS

HOT EXTRACT pH DATA

	Control Number	Sheet Number	Hot Extract pH Specimen 1	Hot Extract pH Specimen 2
Non-Test Book	302705	1	3.8	4.7
		2	3.8	4.4
		3	3.7	4.3
		4	3.7	4.4
		5	4.6	4.4
Non-Test Book	302590	1	4.1	4.3
		2	4.1	4.9
		3	5.0	4.9
		4	5.0	5.1
		5	4.3	5.1
Non-Test Book	302655	1	4.8	4.8
		2	4.8	4.8
		3	4.8	4.9
		4	4.8	5.2
		5	4.8	5.1
Non-Test Book	100105	1	9.3	9.0
		2	9.5	8.8
		3	9.6	8.9
		4	9.4	8.8
		5	9.5	8.9

LIBRARY OF CONGRESS

HOT EXTRACT pH DATA

	Control Number	Sheet Number	Hot Extract pH Specimen 1	Hot Extract pH Specimen 2
Non–Test Book	302809	1	9.5	9.4
		2	9.5	9.7
		3	9.1	9.4
		4	9.0	9.8
		5	9.6	9.8
Non–Test Book	301653	1	5.2	5.2
		2	5.2	5.2
		3	5.2	5.2
		4	5.2	5.2
		5	5.2	5.2
Half–Book	20006B	1	9.7	9.3
		2	9.7	10.0
		3	9.7	10.0
		4	9.6	9.8
		5	9.3	9.9
Half–Book	20042B	1	4.1	4.1
		2	4.1	4.1
		3	4.1	4.1
		4	4.1	4.1
		5	4.1	4.1

LIBRARY OF CONGRESS

HOT EXTRACT pH DATA

	Control Number	Sheet Number	Hot Extract pH Specimen 1	Hot Extract pH Specimen 2
Half-Book	20144B	1	4.3	4.3
		2	4.3	4.0
		3	4.0	4.0
		4	4.0	9.3
		5	4.3	9.3
Test-Book Part G	304010	1	5.0	4.7
		2	4.8	4.8
		3	4.9	4.8
		4	4.9	4.7
		5	4.9	4.7

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 101448

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
59–62	1	3.1	187–190	1	3.6
	2	3.0		2	3.6
	3	3.0		3	3.6
	4	3.0		4	3.6
63–66	5	3.3	191–194	5	3.6
	6	3.2		6	3.6
	7	3.2		7	3.6
	8	3.1		8	3.6
123–126	1	2.4	251–254	1	3.4
	2	2.8		2	2.3
	3	2.8		3	3.4
	4	2.9		4	3.4
127–130	5	3.3	255–258	5	3.3
	6	3.2		6	3.5
	7	3.2		7	3.4
	8	3.2		8	3.3

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 100217

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
59–62	1	<0.1	183–186	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
63–66	5	<0.1	187–190	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
121–124	1	<0.1	210–213	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
125–128	5	<0.1	214–217	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number <u>302928</u>

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
39–46	1	<0.1	131–138	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
47–54	5	<0.1	139–146	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
85–92	1	<0.1	179–186	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
93–100	5	<0.1	187–194	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 301865

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
67–72	1	<0.1	211–216	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
73–78	5	<0.1	217–222	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
138–144	1	<0.1	283–288	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
145–158	5	<0.1	289–294	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 301670

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
113–114	1	3.8	169–170	1	<0.1
	2	4.3		2	<0.1
	3	4.4		3	<0.1
	4	4.2		4	<0.1
115–116	5	<0.1	171–172	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
55–56	1	5.5	225–226	1	<0.1
	2	5.6		2	<0.1
	3	5.8		3	<0.1
	4	6.0		4	<0.1
57–58	5	5.8	227–228	5	<0.1
	6	5.7		6	<0.1
	7	6.1		7	<0.1
	8	6.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 301866

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
33–36	1	<0.1	107–110	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
37–40	5	<0.1	111–114	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
71–74	1	<0.1	143–146	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
75–78	5	<0.1	148–150	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 303101

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
101–108	1	0.8	319–326	1	0.2
	2	0.7		2	0.2
	3	0.7		3	0.2
	4	0.7		4	0.2
109–116	5	0.7	327–334	5	0.2
	6	0.7		6	0.3
	7	0.6		7	0.2
	8	0.7		8	0.2
211–218	1	7.6	427–434	1	6.6
	2	7.7		2	6.4
	3	7.9		3	6.7
	4	8.1		4	6.6
219–226	5	5.1	435–442	5	6.7
	6	5.1		6	6.5
	7	5.2		7	6.3
	8	5.3		8	6.4

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 301884

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
17-20	1	<0.1	59-62	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
21-24	5	<0.1	63-66	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
37-40	1	<0.1	79-82	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
41-44	5	<0.1	83-86	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 100444

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
1431–1436	1	<0.1	1475–1480	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
1437–1442	5	<0.1	1481–1486	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1
1453–1458	1	<0.1	1495–1502	1	<0.1
	2	<0.1		2	<0.1
	3	<0.1		3	<0.1
	4	<0.1		4	<0.1
1459–1464	5	<0.1	1503–1508	5	<0.1
	6	<0.1		6	<0.1
	7	<0.1		7	<0.1
	8	<0.1		8	<0.1

LIBRARY OF CONGRESS

ALKALINE RESERVE DATA

Control Number 100439

Page Number	Piece Number	CaCO3, %	Page Number	Piece Number	CaCO3, %
107–108	1	5.7	325–326	1	4.8
	2	5.8		2	4.3
	3	5.6		3	4.8
	4	6.0		4	4.9
109–110	5	5.8	327–328	5	5.0
	6	5.8		6	5.0
	7	5.8		7	5.0
	8	5.6		8	5.0
217–218	1	5.2	433–434	1	5.0
	2	5.2		2	5.1
	3	5.0		3	5.0
	4	5.2		4	5.1
219–220	5	5.2	435–436	5	5.0
	6	5.0		6	5.0
	7	5.2		7	4.9
	8	5.2		8	5.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 0 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Specimen Number			Specimen Number		
1	157	448	1	223	360
2	183	298	2	312	507
3	253	194	3	196	149
4	199	323	4	235	425
5	245	128	5	225	292
6	158	259	6	397	512
7	217	385	7	171	418
8	247	362	8	354	550
9	218	303	9	372	485
10	147	259	10	151	313
11	200	131	11	286	632
12	378	390	12	188	489
Average	217	290	Average	259	428
Std. Dev.	62.3	101.4	Std. Dev	83.0	131.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 0 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Specimen Number			Specimen Number		
1	244	447	1	1070	804
2	516	603	2	463	729
3	361	691	3	1101	1565
4	846	556	4	477	1431
5	352	491	5	869	1831
6	272	421	6	957	1088
7	530	432	7	935	1416
8	487	634	8	969	823
9	526	219	9	1291	708
10	440	466	10	434	1270
11	454	436	11	450	703
12	501	324	12	926	1857
Average	461	477	Average	829	1185
Std. Dev.	156.0	131.6	Std. Dev	295.6	435.7

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 0 days

BOOK PART LETTER G

Sheet #	11	16
Specimen Number		
1	400	124
2	335	218
3	343	243
4	317	158
5	339	326
6	289	219
7	299	242
8	343	249
9	277	307
10	286	283
11	411	199
12	332	221
Average	331	232
Std. Dev.	42.1	57.4

BOOK PART LETTER H

	11	16
Specimen Number		
1	604	247
2	489	287
3	363	333
4	381	283
5	320	396
6	255	394
7	489	346
8	383	379
9	316	204
10	103	449
11	541	283
12	356	437
Average	383	337
Std. Dev	135.1	77.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 0 days

BOOK PART LETTER	K		BOOK PART LETTER	M	
Sheet #	11	16		11	16
Specimen Number			Specimen Number		
1	494	558	1	1586	1105
2	562	551	2	1351	916
3	704	651	3	1095	937
4	743	645	4	927	621
5	537	713	5	868	963
6	634	670	6	1128	1593
7	464	490	7	1208	1353
8	393	463	8	1088	1176
9	338	418	9	1555	798
10	572	516	10	1126	766
11	266	608	11	1349	786
12	555	394	12	937	1076
Average	522	556	Average	1185	1008
Std. Dev.	141.5	103.2	Std. Dev	234.6	273.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 0 days

BOOK PART LETTER	G		BOOK PART LETTER	H	
Sheet #	11	16		11	16
Specimen Number			Specimen Number		
1	240	354	1	246	294
2	165	350	2	316	185
3	183	357	3	530	411
4	206	225	4	433	388
5	187	143	5	200	251
6	208	153	6	330	476
7	251	301	7	230	313
8	145	230	8	280	463
9	208	185	9	288	377
10	213	291	10	326	321
11	110	140	11	311	215
12	172	220	12	295	303
Average	191	246	Average	315	333
Std. Dev.	39.4	82.8	Std. Dev	89.5	92.4

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 0 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Specimen Number			Specimen Number		
1	416	533	1	762	1467
2	674	503	2	1606	835
3	643	660	3	1225	967
4	583	343	4	979	1153
5	484	615	5	1256	947
6	544	586	6	520	1032
7	448	792	7	1076	1081
8	510	590	8	1284	952
9	523	513	9	1088	863
10	531	438	10	1094	1013
11	589	720	11	1211	1062
12	588	357	12	1060	825
Average	544	554	Average	1097	1016
Std. Dev.	75.8	135.8	Std. Dev	271.3	173.9

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 3 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	349	242	1	315	313
2	227	289	2	70	241
3	299	172	3	279	207
4	170	271	4	185	232
5	321	204	5	195	237
6	278	218	6	308	131
7	256	280	7	155	190
8	279	192	8	320	131
9	242	181	9	203	83
10	326	277	10	199	308
11	190	247	11	185	178
12	170	304	12	323	194
Average	259	240	Average	228	204
Std. Dev.	60.8	45.4	Std. Dev	80.1	68.9

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 3 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	587	542	1	1295	1113
2	385	325	2	324	847
3	419	273	3	1038	233
4	379	475	4	926	346
5	387	440	5	584	938
6	435	619	6	808	696
7	682	464	7	243	593
8	611	485	8	581	1273
9	682	625	9	624	1165
10	447	469	10	641	1121
11	512	405	11	496	1354
12	590	570	12	507	1603
Average	510	474	Average	672	940
Std. Dev.	115.8	107.2	Std. Dev	299.7	413.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 3 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	206	283	1	147	298
2	192	254	2	190	222
3	251	309	3	71	113
4	257	251	4	124	144
5	148	313	5	145	129
6	264	306	6	174	198
7	301	311	7	94	104
8	118	212	8	112	222
9	247	300	9	137	384
10	256	264	10	217	293
11	242	329	11	169	206
12	285	236	12	178	312
Average	231	281	Average	147	219
Std. Dev.	54.6	36.6	Std. Dev	42.0	88.6

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 3 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	560	452	1	564	526
2	624	546	2	1432	557
3	629	530	3	1150	1458
4	703	601	4	392	1066
5	675	264	5	545	1472
6	216	379	6	768	1394
7	623	379	7	530	1740
8	418	564	8	409	1717
9	674	791	9	847	1426
10	687	598	10	774	2531
11	471	523	11	665	1345
12	669	791	12	904	813
Average	579	535	Average	748	1337
Std. Dev.	144.5	156.5	Std. Dev	306.9	555.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 3 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	96	156	1	240	381
2	232	195	2	256	155
3	106	170	3	211	272
4	226	165	4	302	254
5	187	156	5	271	249
6	241	228	6	255	439
7	174	175	7	157	386
8	182	188	8	198	225
9	209	202	9	199	366
10	213	155	10	226	197
11	179	179	11	318	232
12	117	225	12	224	263
Average	180	183	Average	238	285
Std. Dev.	49.6	25.5	Std. Dev	45.7	87.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 3 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	3	7		3	7
Specimen Number			Specimen Number		
1	694	531	1	1215	919
2	241	735	2	420	1203
3	629	508	3	1030	783
4	567	394	4	1293	598
5	492	406	5	1453	295
6	582	506	6	1873	1224
7	527	416	7	940	1045
8	566	426	8	1219	944
9	555	473	9	903	1154
10	650	501	10	611	783
11	440	913	11	1658	1333
12	611	565	12	1221	962
Average	546	531	Average	1153	937
Std. Dev.	118.2	151.6	Std. Dev	410.1	293.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 6 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	233	251	1	181	177
2	222	233	2	316	220
3	155	299	3	254	283
4	179	333	4	152	357
5	217	159	5	128	230
6	173	235	6	181	363
7	196	246	7	217	303
8	235	263	8	140	179
9	226	136	9	246	316
10	356	330	10	227	187
11	193	178	11	233	238
12	151	205	12	133	251
Average	211	239	Average	201	259
Std. Dev.	54.1	62.8	Std. Dev	57.9	65.6

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 6 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	496	375	1	1211	459
2	497	652	2	780	665
3	563	586	3	591	486
4	553	411	4	1081	261
5	469	364	5	1409	420
6	457	437	6	792	593
7	591	272	7	1210	1033
8	546	475	8	936	586
9	604	405	9	501	507
10	599	446	10	996	1191
11	445	361	11	747	662
12	270	649	12	795	1003
Average	508	453	Average	921	656
Std. Dev.	93.4	119.0	Std. Dev	270.6	279.5

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 6 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	112	164	1	123	69
2	77	192	2	159	138
3	81	266	3	202	95
4	109	176	4	99	126
5	99	149	5	146	158
6	142	231	6	48	57
7	146	292	7	155	128
8	106	169	8	145	218
9	100	178	9	79	57
10	124	245	10	225	153
11	151	155	11	169	138
12	142	173	12	254	128
Average	116	199	Average	150	122
Std. Dev.	25.2	47.2	Std. Dev	59.1	46.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 6 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	610	277	1	1048	577
2	437	294	2	1280	663
3	363	327	3	1140	140
4	252	460	4	851	669
5	416	395	5	750	482
6	552	261	6	796	427
7	434	178	7	1239	390
8	220	260	8	1227	414
9	276	381	9	973	240
10	353	444	10	1411	339
11	413	523	11	1314	517
12	388	466	12	607	671
Average	393	356	Average	1053	461
Std. Dev.	114.0	105.1	Std. Dev	256.6	170.7

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 6 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	85	121	1	119	152
2	129	126	2	234	155
3	150	139	3	151	175
4	145	147	4	113	179
5	96	188	5	112	103
6	131	219	6	290	181
7	127	155	7	134	108
8	131	136	8	199	162
9	118	130	9	290	144
10	83	118	10	58	141
11	70	209	11	98	108
12	100	190	12	111	228
Average	114	157	Average	159	153
Std. Dev.	26.1	35.6	Std. Dev	76.5	36.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 6 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	10	15		10	15
Specimen Number			Specimen Number		
1	533	619	1	304	1351
2	513	496	2	441	312
3	598	609	3	576	899
4	354	657	4	695	543
5	201	614	5	921	310
6	595	639	6	358	706
7	607	597	7	875	1043
8	562	553	8	457	1020
9	516	525	9	511	904
10	465	634	10	749	164
11	459	400	11	680	699
12	701	583	12	994	645
Average	509	577	Average	630	716
Std. Dev.	130.9	73.4	Std. Dev	225.8	349.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 9 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	65	193	1	159	101
2	109	123	2	222	97
3	104	159	3	75	163
4	139	220	4	166	115
5	91	179	5	70	132
6	107	139	6	138	103
7	115	145	7	226	140
8	79	179	8	263	98
9	144	139	9	273	284
10	60	222	10	195	76
11	233	135	11	85	131
12	121	206	12	200	118
Average	114	170	Average	173	130
Std. Dev.	45.7	34.8	Std. Dev	70.0	53.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 9 days

BOOK PART LETTER	K		BOOK PART LETTER	M	
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	443	410	1	775	645
2	525	518	2	640	636
3	622	308	3	920	603
4	503	418	4	997	163
5	431	361	5	855	224
6	684	389	6	618	395
7	352	421	7	473	421
8	453	408	8	795	389
9	302	464	9	760	581
10	496	470	10	644	607
11	163	293	11	654	292
12	500	414	12	129	438
Average	456	406	Average	688	450
Std. Dev.	138.6	64.1	Std. Dev	227.7	166.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 9 days

BOOK PART LETTER	G		BOOK PART LETTER	H	
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	124	63	1	62	134
2	202	93	2	164	180
3	121	61	3	148	178
4	161	116	4	99	157
5	77	95	5	160	108
6	130	81	6	175	124
7	147	115	7	202	64
8	79	124	8	207	149
9	127	165	9	171	96
10	151	151	10	225	115
11	151	84	11	162	193
12	166	132	12	145	191
Average	136	107	Average	160	141
Std. Dev.	35.2	33.0	Std. Dev	45.0	41.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 9 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	356	675	1	522	228
2	430	331	2	658	342
3	386	345	3	1088	491
4	522	383	4	557	691
5	264	550	5	599	775
6	407	219	6	799	167
7	761	396	7	745	189
8	438	639	8	600	407
9	273	318	9	670	348
10	508	653	10	1125	251
11	479	393	11	372	108
12	614	558	12	379	198
Average	453	455	Average	676	350
Std. Dev.	139.5	152.4	Std. Dev	237.8	210.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 9 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	102	88	1	131	114
2	50	110	2	144	110
3	107	47	3	59	68
4	101	56	4	146	121
5	123	156	5	131	117
6	95	89	6	97	109
7	117	118	7	39	89
8	176	71	8	81	134
9	123	70	9	103	122
10	122	68	10	146	68
11	106	119	11	97	118
12	70	109	12	124	167
Average	108	92	Average	108	111
Std. Dev.	30.8	31.6	Std. Dev	35.2	27.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 9 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	4	6		4	6
Specimen Number			Specimen Number		
1	424	198	1	179	497
2	539	436	2	630	741
3	419	360	3	774	932
4	476	633	4	429	842
5	448	523	5	697	454
6	625	456	6	650	760
7	468	549	7	659	839
8	340	462	8	605	811
9	335	676	9	508	563
10	430	393	10	928	647
11	453	430	11	269	685
12	433	599	12	512	686
Average	449	476	Average	570	705
Std. Dev.	78.2	131.2	Std. Dev	207.9	146.0

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 12 days

BOOK PART LETTER	G		BOOK PART LETTER	H	
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	100	100	1	111	149
2	139	143	2	186	161
3	113	145	3	144	142
4	68	133	4	96	193
5	127	92	5	95	172
6	124	111	6	101	82
7	129	105	7	108	127
8	119	127	8	75	156
9	145	93	9	73	133
10	125	65	10	92	203
11	83	92	11	166	194
12	103	168	12	135	221
Average	115	115	Average	115	161
Std. Dev.	22.6	29.1	Std. Dev	35.4	38.5

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 12 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	515	395	1	1051	329
2	469	289	2	319	143
3	604	275	3	586	364
4	487	327	4	518	413
5	433	263	5	624	300
6	508	458	6	812	273
7	528	348	7	627	315
8	779	267	8	598	122
9	429	268	9	690	328
10	486	487	10	402	84
11	864	439	11	634	692
12	349	244	12	685	155
Average	538	338	Average	629	293
Std. Dev.	147.4	85.8	Std. Dev	186.2	164.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 12 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	53	96	1	44	90
2	66	109	2	53	84
3	41	122	3	95	120
4	64	88	4	30	119
5	51	103	5	79	57
6	39	118	6	46	40
7	64	109	7	25	53
8	72	87	8	57	55
9	35	174	9	121	95
10	50	115	10	33	123
11	36	135	11	37	86
12	68	133	12	20	64
Average	53	116	Average	53	82
Std. Dev.	13.4	24.0	Std. Dev	30.6	28.7

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 12 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	588	194	1	476	135
2	600	464	2	424	232
3	282	436	3	296	283
4	298	493	4	581	266
5	294	487	5	243	429
6	393	526	6	270	369
7	588	429	7	424	339
8	673	577	8	416	396
9	619	477	9	278	208
10	564	711	10	414	387
11	556	351	11	243	638
12	668	401	12	207	342
Average	510	462	Average	356	335
Std. Dev.	149.5	124.6	Std. Dev	115.2	128.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 12 days

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	111	143	1	118	241
2	143	79	2	96	96
3	151	119	3	74	167
4	127	161	4	49	193
5	128	89	5	66	124
6	121	103	6	43	147
7	136	131	7	100	176
8	73	58	8	114	171
9	136	206	9	141	80
10	155	139	10	103	192
11	206	85	11	176	235
12	113	158	12	151	146
Average	133	123	Average	103	164
Std. Dev.	31.5	42.1	Std. Dev	40.7	49.3

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 12 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	9	14		9	14
Specimen Number			Specimen Number		
1	449	587	1	829	516
2	648	648	2	887	202
3	368	1097	3	543	507
4	289	660	4	658	98
5	333	571	5	551	327
6	455	542	6	889	245
7	403	579	7	749	207
8	581	432	8	684	553
9	503	410	9	761	199
10	422	496	10	1276	225
11	510	616	11	1249	150
12	568	502	12	982	205
Average	461	595	Average	838	286
Std. Dev.	106.5	176.4	Std. Dev	238.5	154.1

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 18 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
1	65	58	1	31	29
2	117	87	2	73	48
3	44	65	3	41	66
4	44	58	4	52	60
5	30	56	5	63	59
6	97	53	6	23	76
7	91	70	7	84	42
8	112	50	8	75	66
9	73	72	9	65	38
10	65	53	10	54	48
11	50	74	11	31	65
12	40	78	12	45	74
Average	69	65	Average	53	56
Std. Dev.	29.3	11.7	Std. Dev	19.5	14.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 18 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
207	445	341	1	475	339
406	310	551	2	670	413
433	297	357	3	699	170
289	370	211	4	611	97
565	522	509	5	409	329
291	431	495	6	691	260
360	736	236	7	370	171
394	523	420	8	536	160
423	564	512	9	949	246
360	401	396	10	393	223
555	313	231	11	736	312
425	362	298	12	405	88
Average	392	380	Average	579	234
Std. Dev.	103.4	120.1	Std. Dev	177.8	101.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 18 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
1	31	60	1	34	43
2	12	78	2	23	108
3	31	83	3	65	68
4	53	78	4	43	46
5	20	60	5	63	69
6	22	49	6	48	76
7	32	33	7	14	86
8	46	34	8	63	114
9	25	67	9	36	98
10	23	54	10	33	113
11	33	61	11	30	93
12	32	66	12	18	106
Average	30	60	Average	39	85
Std. Dev.	11.1	16.0	Std. Dev	17.6	24.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 18 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
1	409	286	1	249	246
2	292	537	2	334	739
3	435	301	3	207	388
4	409	333	4	344	336
5	252	462	5	344	558
6	486	402	6	223	607
7	594	363	7	213	565
8	252	631	8	167	342
9	403	374	9	283	609
10	491	390	10	215	553
11	512	676	11	113	706
12	197	819	12	248	612
Average	394	465	Average	245	522
Std. Dev.	121.9	167.1	Std. Dev	71.6	156.4

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 18 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
1	110	66	1	88	80
2	109	75	2	34	53
3	120	55	3	16	104
4	81	75	4	28	29
5	83	179	5	13	43
6	121	89	6	42	44
7	65	81	7	73	69
8	95	55	8	63	48
9	122	116	9	30	44
10	168	48	10	58	60
11	111	74	11	24	50
12	114	36	12	27	44
Average	108	79	Average	41	56
Std. Dev.	26.2	37.7	Std. Dev	23.8	20.2

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 18 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	1	5		1	5
Specimen Number			Specimen Number		
1	492	430	1	484	124
2	393	434	2	131	179
3	693	396	3	238	85
4	497	494	4	302	120
5	557	353	5	460	126
6	499	640	6	396	205
7	429	458	7	259	124
8	569	326	8	612	115
9	559	472	9	317	104
10	437	314	10	312	61
11	406	629	11	157	74
12	651	474	12	297	121
Average	515	452	Average	330	120
Std. Dev.	94.5	103.6	Std. Dev	138.1	40.3

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 24 days

BOOK PART LETTER	G		BOOK PART LETTER	H	
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	27	59	1	43	33
2	17	57	2	30	52
3	31	73	3	43	52
4	20	73	4	39	58
5	29	60	5	73	43
6	20	85	6	37	48
7	21	55	7	42	48
8	22	75	8	58	20
9	27	60	9	15	46
10	15	46	10	14	27
11	26	54	11	16	53
12	26	51	12	12	40
Average	23	62	Average	35	43
Std. Dev.	5.0	11.6	Std. Dev	18.9	11.4

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 24 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	495	475	1	227	535
2	344	346	2	135	564
3	413	612	3	201	448
4	574	385	4	169	466
5	350	272	5	187	400
6	247	423	6	93	239
7	413	474	7	59	277
8	607	441	8	85	287
9	601	704	9	70	188
10	460	469	10	196	73
11	391	276	11	187	292
12	202	338	12	149	223
Average	425	435	Average	147	333
Std. Dev.	130.5	127.9	Std. Dev	57.2	149.6

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 24 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	37	31	1	29	38
2	45	35	2	24	28
3	36	59	3	15	25
4	31	29	4	17	38
5	42	45	5	15	31
6	46	24	6	23	34
7	39	31	7	8	29
8	46	35	8	16	24
9	41	28	9	11	39
10	54	34	10	8	24
11	27	25	11	15	17
12	17	30	12	17	30
Average	38	34	Average	17	30
Std. Dev.	9.9	9.6	Std. Dev	6.3	6.7

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 24 days

BOOK PART LETTER	K		BOOK PART LETTER	M	
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	697	467	1	131	223
2	579	393	2	216	197
3	529	358	3	382	249
4	505	462	4	400	108
5	509	377	5	372	75
6	465	299	6	309	298
7	438	320	7	166	228
8	516	340	8	397	150
9	246	321	9	173	338
10	396	585	10	196	198
11	535	473	11	360	252
12	441	343	12	232	156
Average	488	395	Average	278	206
Std. Dev.	108.6	85.1	Std. Dev	101.9	75.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 24 days

BOOK PART LETTER	G		BOOK PART LETTER	H	
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	12	79	1	24	24
2	21	68	2	31	39
3	23	45	3	25	22
4	21	68	4	17	21
5	12	41	5	14	42
6	14	60	6	33	52
7	26	37	7	17	33
8	11	50	8	33	36
9	16	39	9	25	35
10	19	55	10	20	20
11	11	57	11	21	26
12	13	41	12	12	31
Average	17	53	Average	23	32
Std. Dev.	5.2	13.5	Std. Dev	7.1	9.7

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 24 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	8	13		8	13
Specimen Number			Specimen Number		
1	325	339	1	215	214
2	368	344	2	186	144
3	490	316	3	223	132
4	471	266	4	160	228
5	509	439	5	227	127
6	435	334	6	121	59
7	402	279	7	94	60
8	361	292	8	96	32
9	604	384	9	104	80
10	495	351	10	36	99
11	484	370	11	174	122
12	462	358	12	110	106
Average	451	339	Average	146	117
Std. Dev.	77.1	47.9	Std. Dev	60.9	59.1

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 30 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	10	41	1	35	8
2	12	51	2	43	17
3	25	29	3	26	13
4	15	59	4	16	26
5	16	38	5	29	16
6	16	47	6	29	32
7	20	37	7	30	16
8	13	29	8	39	16
9	17	37	9	21	65
10	18	32	10	16	19
11	38	37	11	24	33
12	16	22	12	37	13
Average	18	38	Average	29	23
Std. Dev.	7.4	10.3	Std. Dev	8.7	15.3

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303589

Aging Time: 30 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	300	447	1	25	53
2	486	312	2	80	128
3	407	477	3	57	25
4	287	323	4	76	109
5	384	370	5	94	111
6	445	500	6	51	50
7	393	203	7	107	151
8	260	311	8	63	108
9	307	260	9	90	41
10	283	259	10	137	64
11	264	327	11	39	80
12	189	277	12	131	43
Average	334	339	Average	79	80
Std. Dev.	87.8	92.7	Std. Dev	34.7	40.1

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 30 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	44	34	1	10	42
2	55	65	2	23	18
3	26	51	3	14	26
4	46	49	4	17	28
5	49	40	5	20	39
6	17	39	6	16	21
7	46	65	7	16	20
8	45	54	8	27	24
9	42	65	9	24	57
10	40	64	10	15	22
11	35	44	11	21	30
12	33	51	12	21	51
Average	40	52	Average	19	32
Std. Dev.	10.5	11.1	Std. Dev	4.8	12.8

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303591

Aging Time: 30 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	295	460	1	164	32
2	348	457	2	237	23
3	319	484	3	110	80
4	550	272	4	252	46
5	413	546	5	243	25
6	374	376	6	197	23
7	160	361	7	208	53
8	513	532	8	122	23
9	359	356	9	138	33
10	375	273	10	67	55
11	411	724	11	115	52
12	245	316	12	106	87
Average	364	430	Average	163	44
Std. Dev.	106.4	131.6	Std. Dev	62.4	22.1

LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

CONTROL NUMBER 303590

Aging Time: 30 days

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	17	10	1	4	26
2	13	32	2	11	19
3	43	23	3	11	28
4	13	18	4	10	7
5	15	36	5	7	10
6	45	25	6	11	15
7	10	45	7	9	15
8	6	19	8	10	14
9	9	20	9	12	17
10	7	17	10	6	19
11	6	21	11	8	22
12	4	21	12	9	20
Average	16	24	Average	9	18
Std. Dev.	13.8	9.5	Std. Dev	2.4	6.1

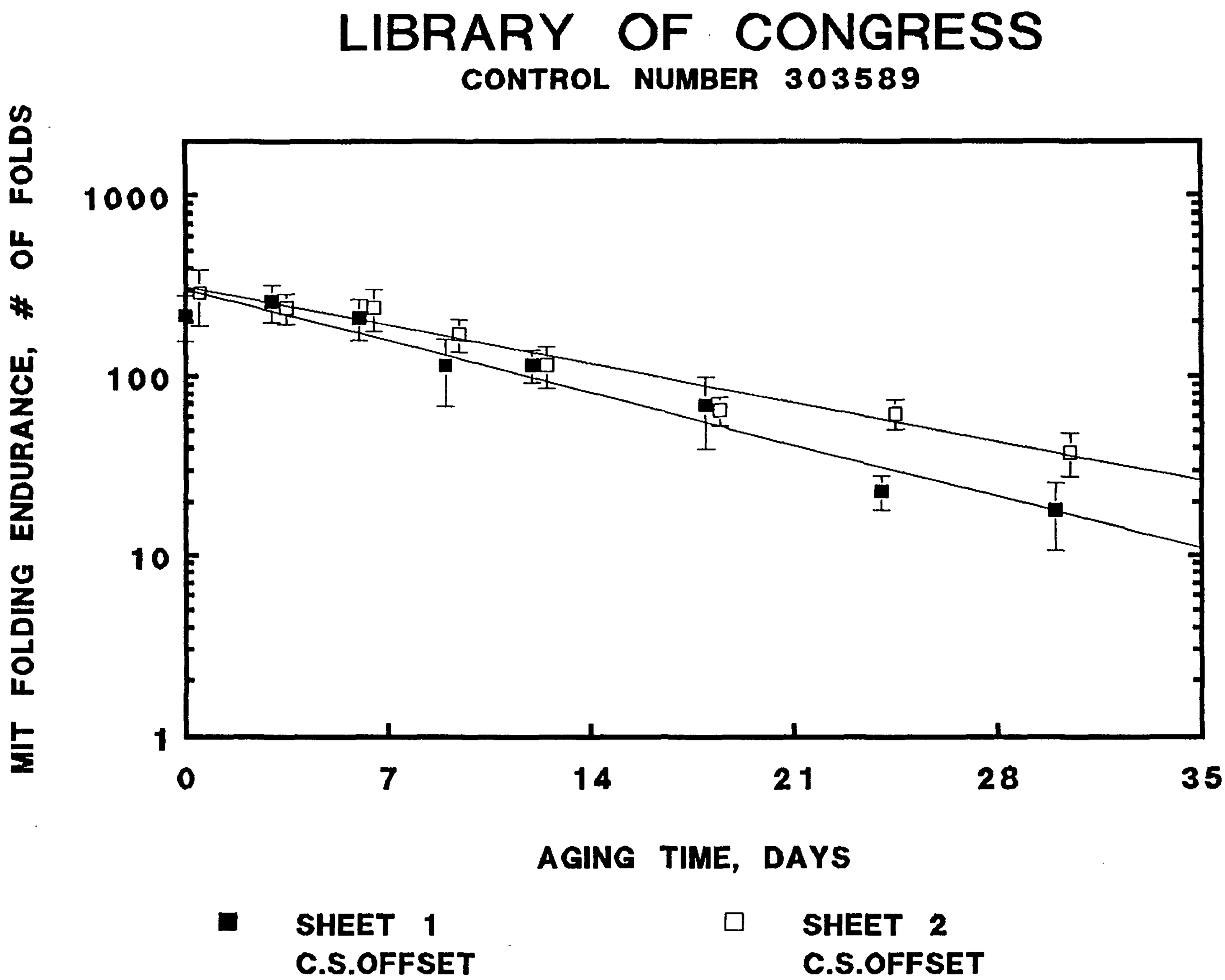
LIBRARY OF CONGRESS

MIT FOLDING ENDURANCE DATA

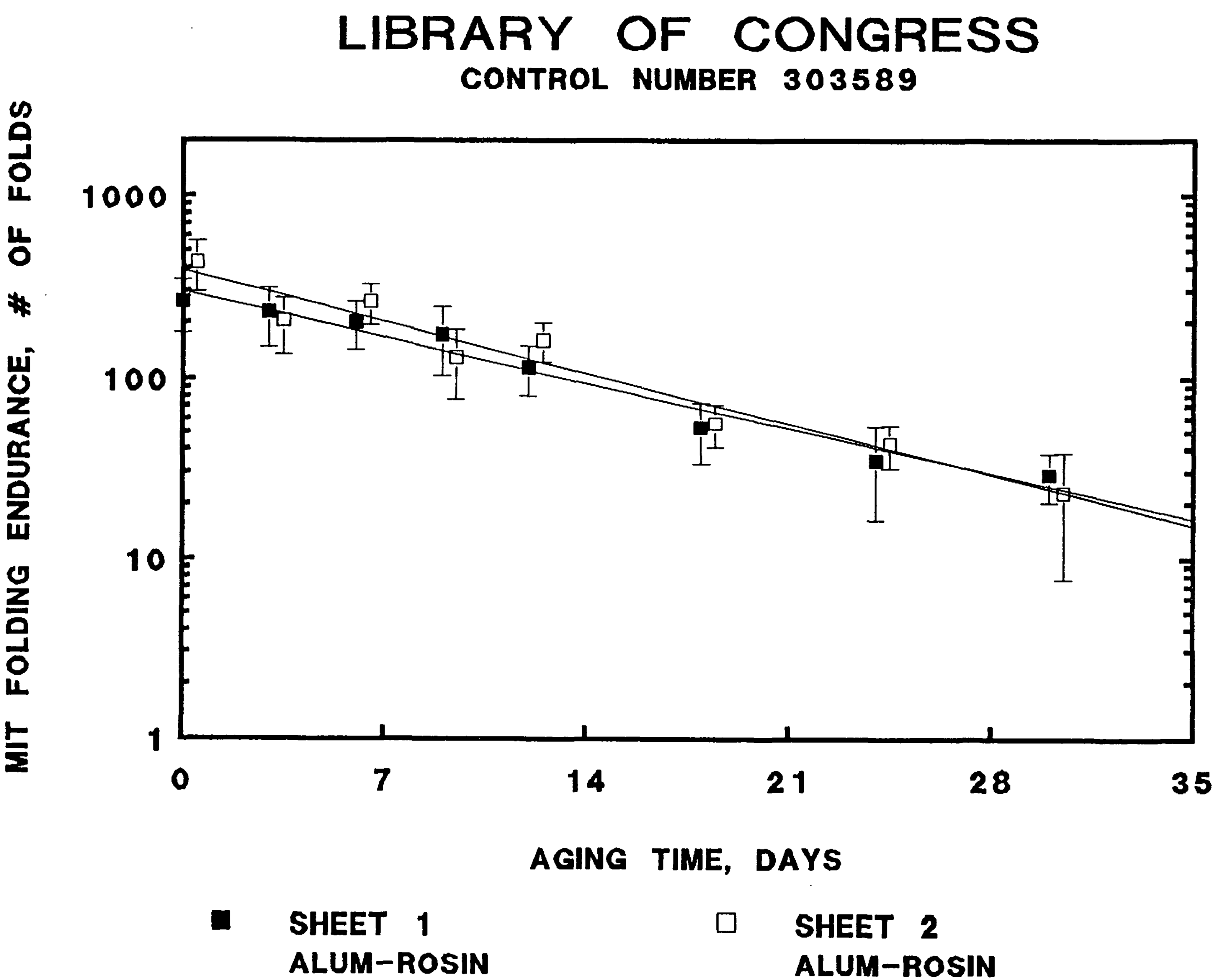
CONTROL NUMBER 303590

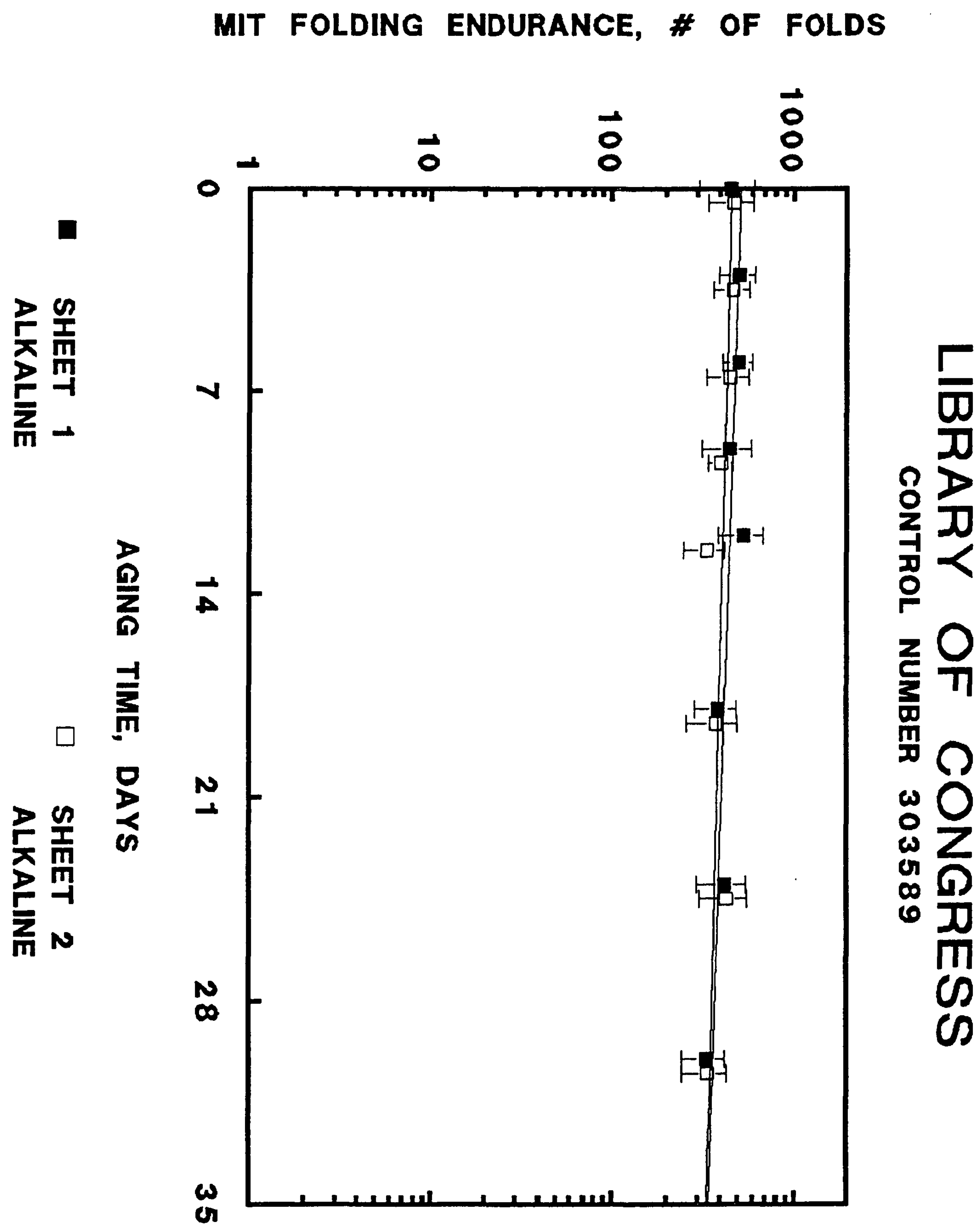
Aging Time: 30 days

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Specimen Number			Specimen Number		
1	396	353	1	41	197
2	337	451	2	66	150
3	238	488	3	79	356
4	312	265	4	57	174
5	350	476	5	29	212
6	350	447	6	46	336
7	373	407	7	43	115
8	337	645	8	49	176
9	627	479	9	61	246
10	417	366	10	18	206
11	228	607	11	32	168
12	410	173	12	63	177
Average	365	430	Average	49	209
Std. Dev.	101.9	131.4	Std. Dev	17.5	71.7



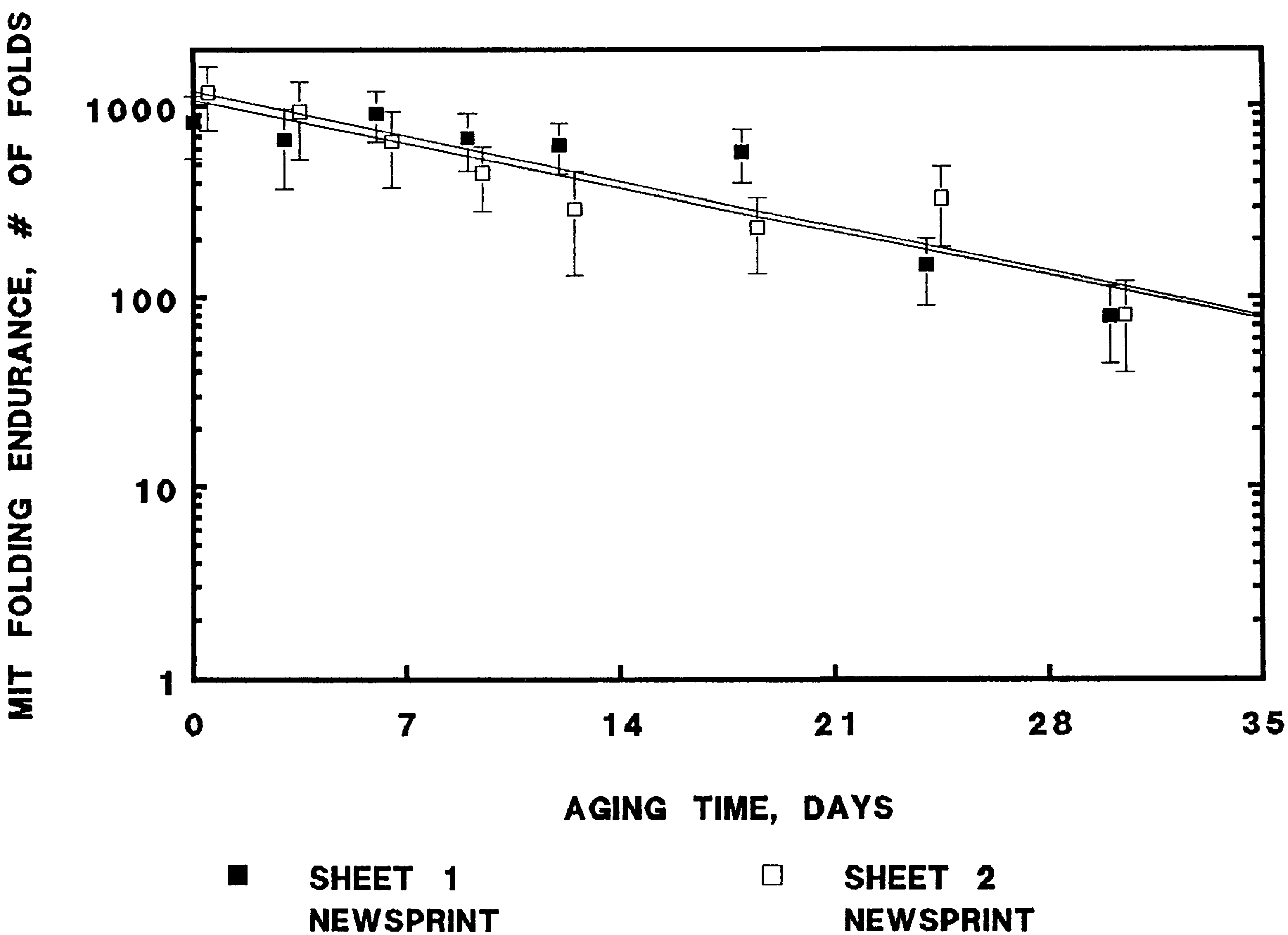
LIBRARY OF CONGRESS
CONTROL NUMBER 303589
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET

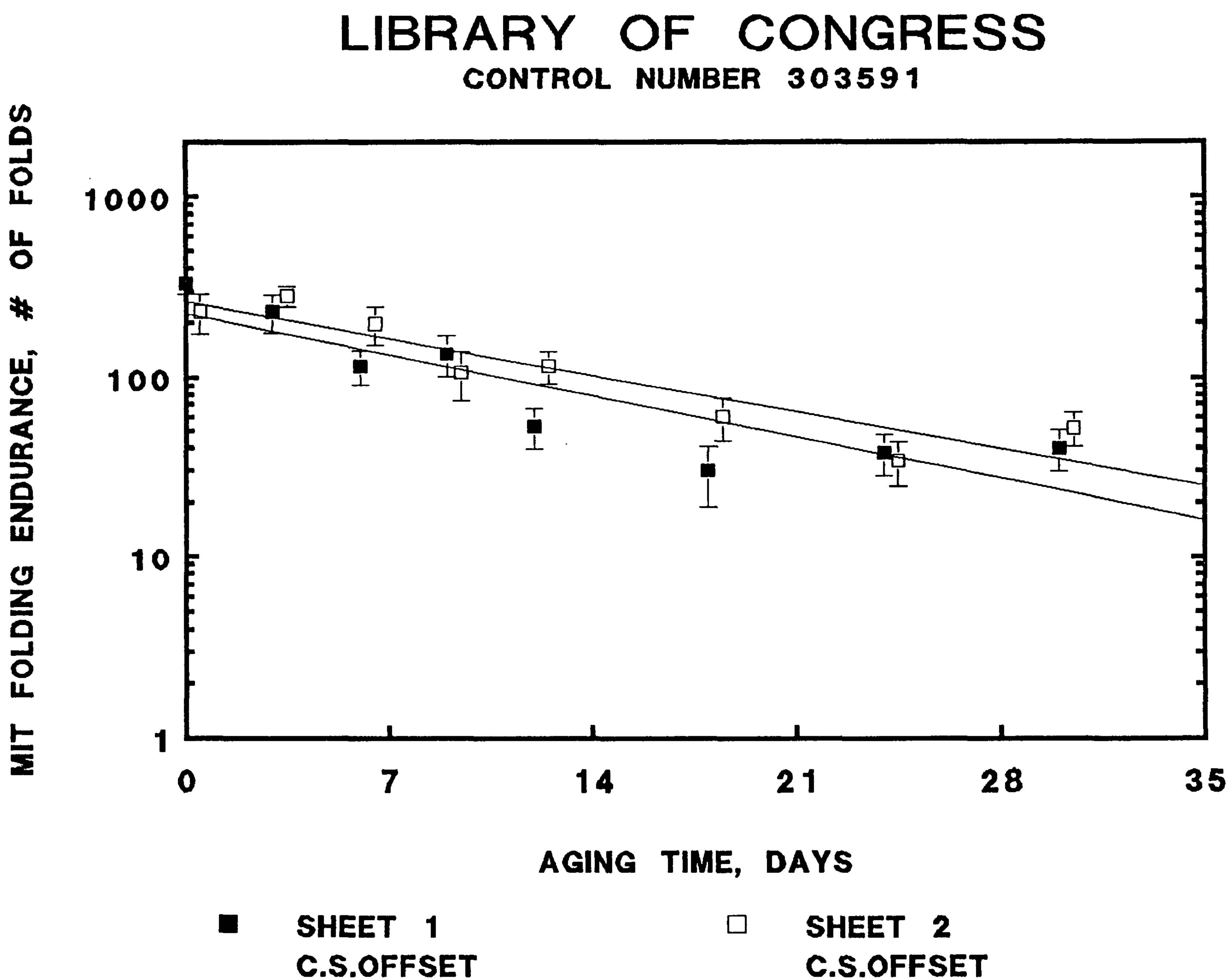

LIBRARY OF CONGRESS
CONTROL NUMBER 303589
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALUM-ROSIN
SHEET 2
ALUM-ROSIN


LIBRARY OF CONGRESS
CONTROL NUMBER 303589
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

LIBRARY OF CONGRESS

CONTROL NUMBER 303589

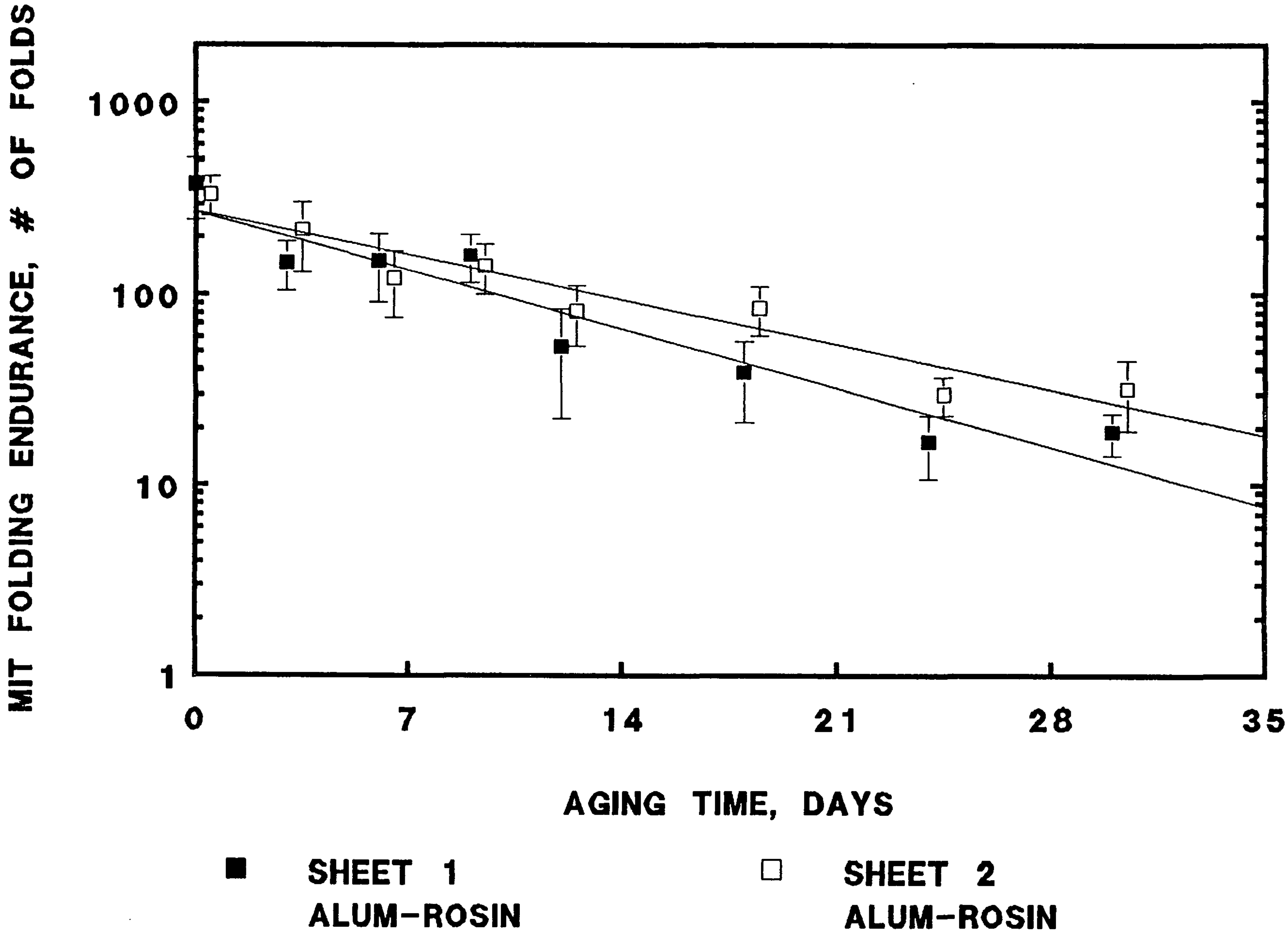




LIBRARY OF CONGRESS
CONTROL NUMBER 303591
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET

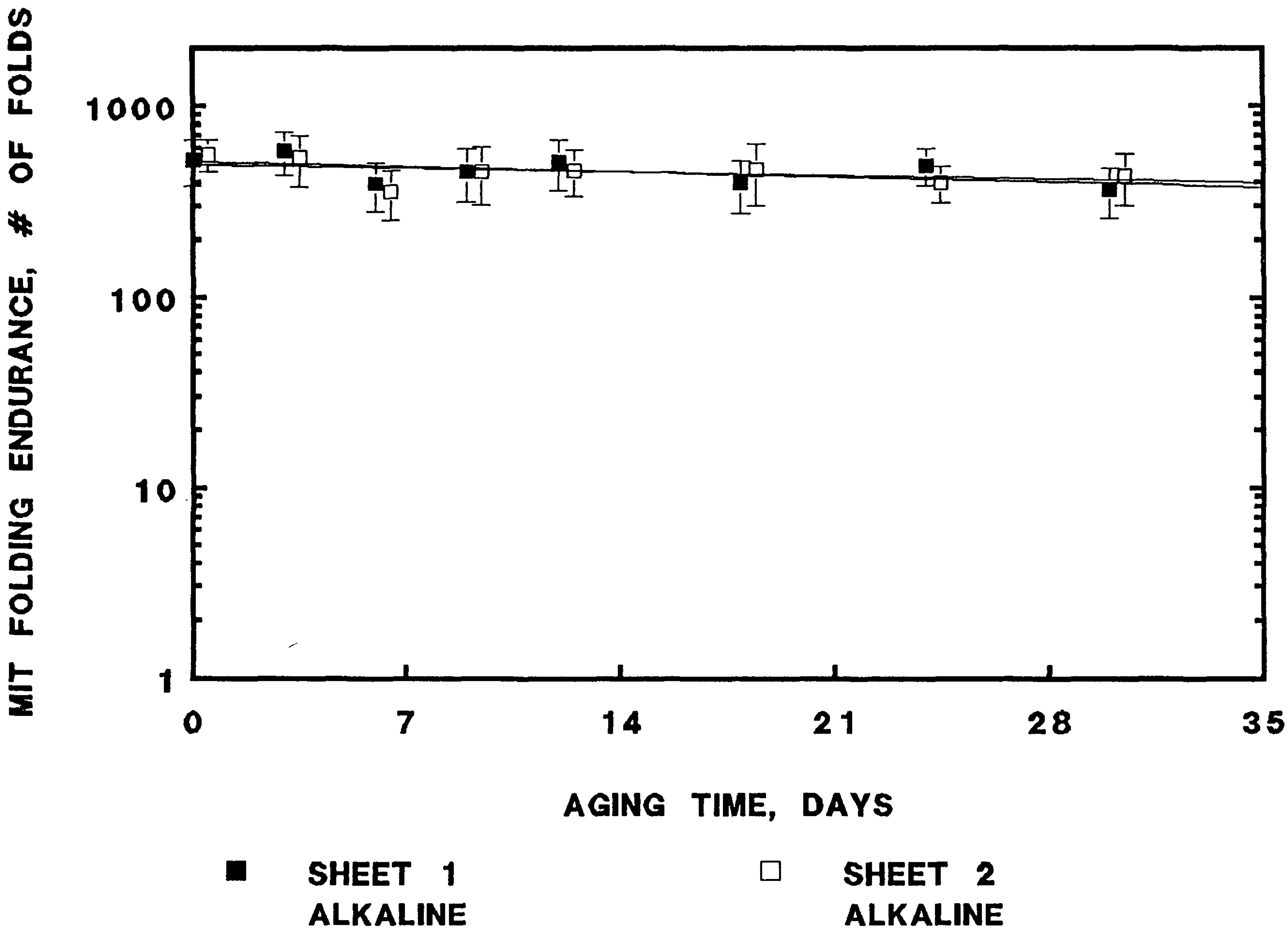
LIBRARY OF CONGRESS

CONTROL NUMBER 303591



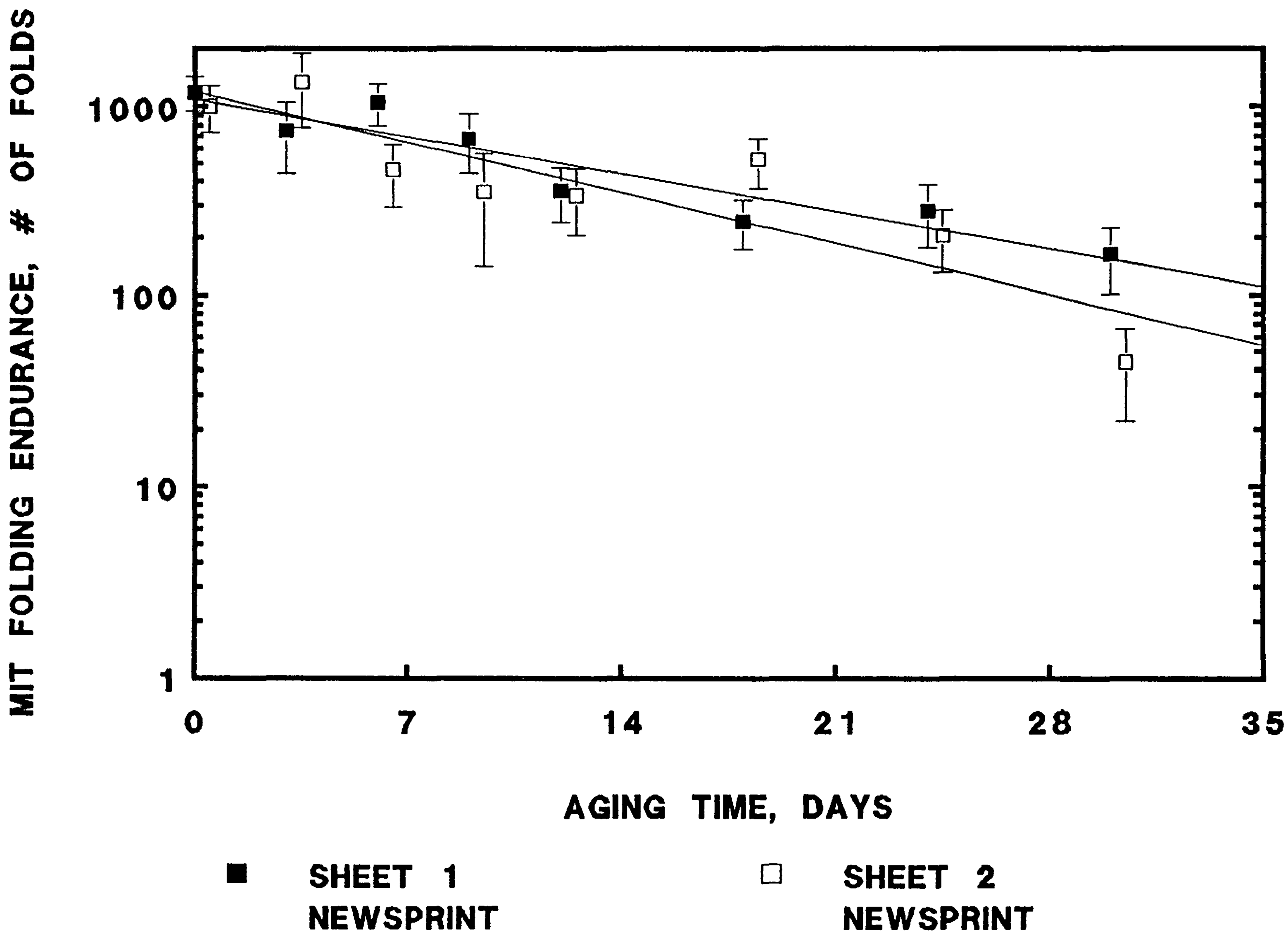
LIBRARY OF CONGRESS

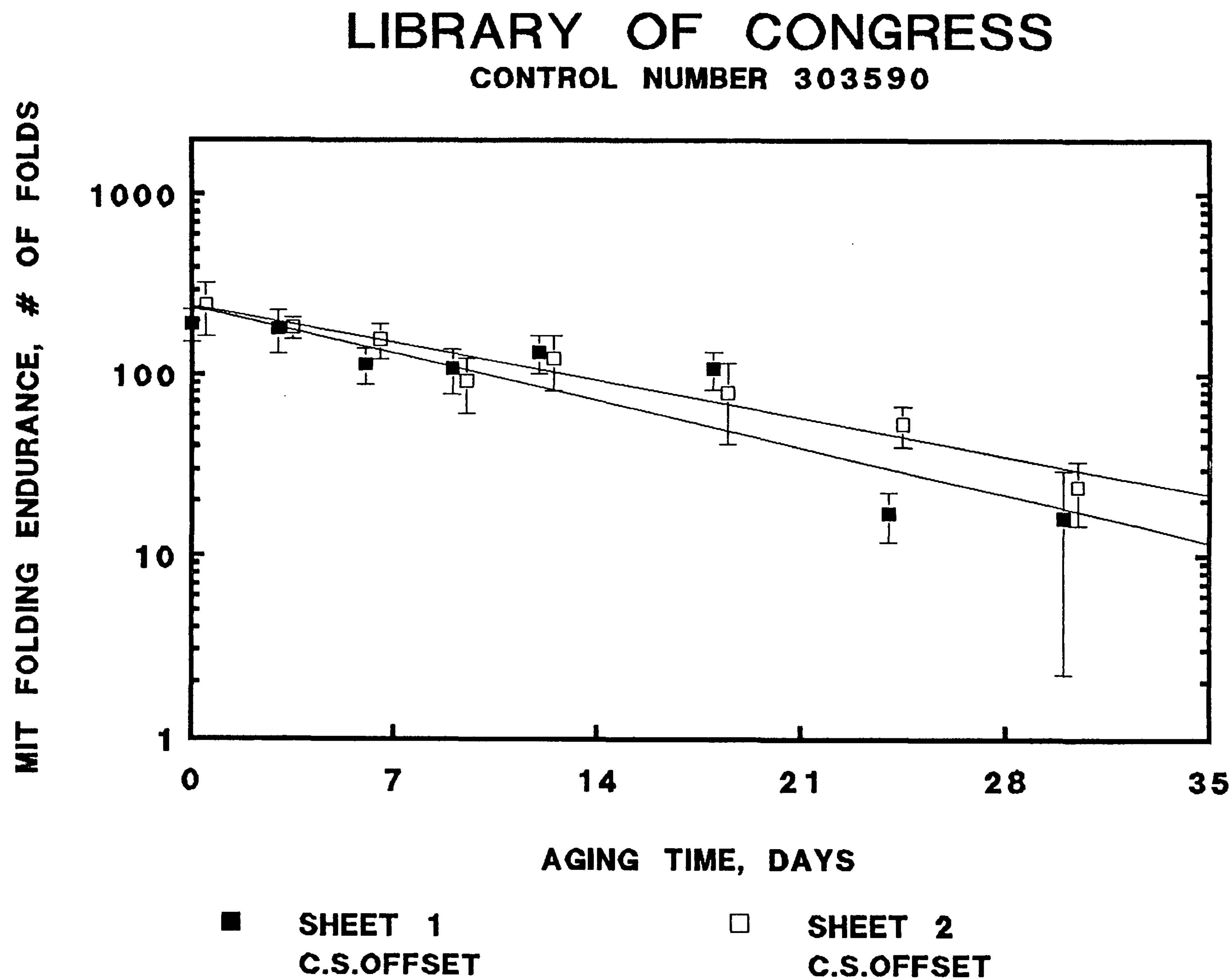
CONTROL NUMBER 303591

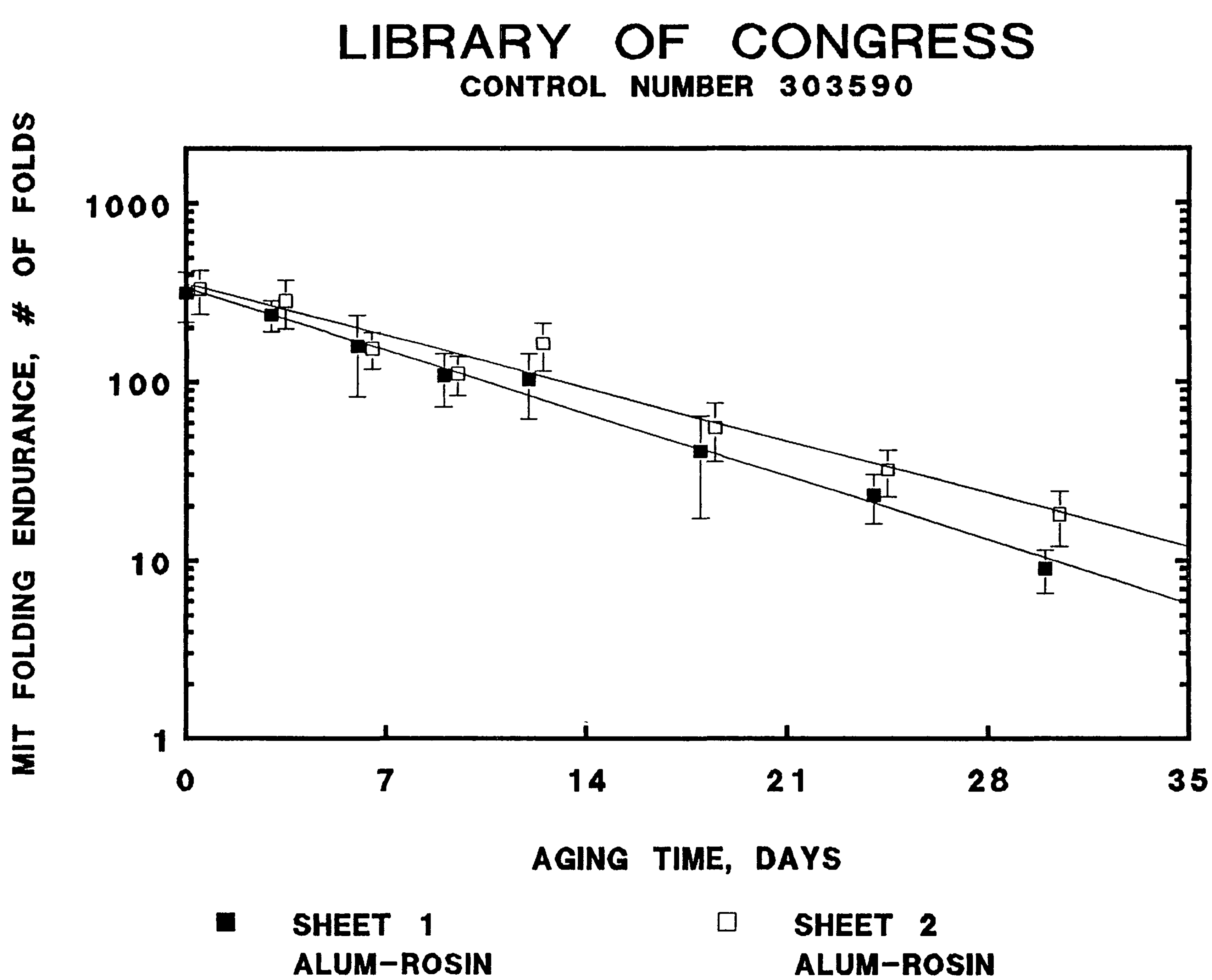


LIBRARY OF CONGRESS

CONTROL NUMBER 303591

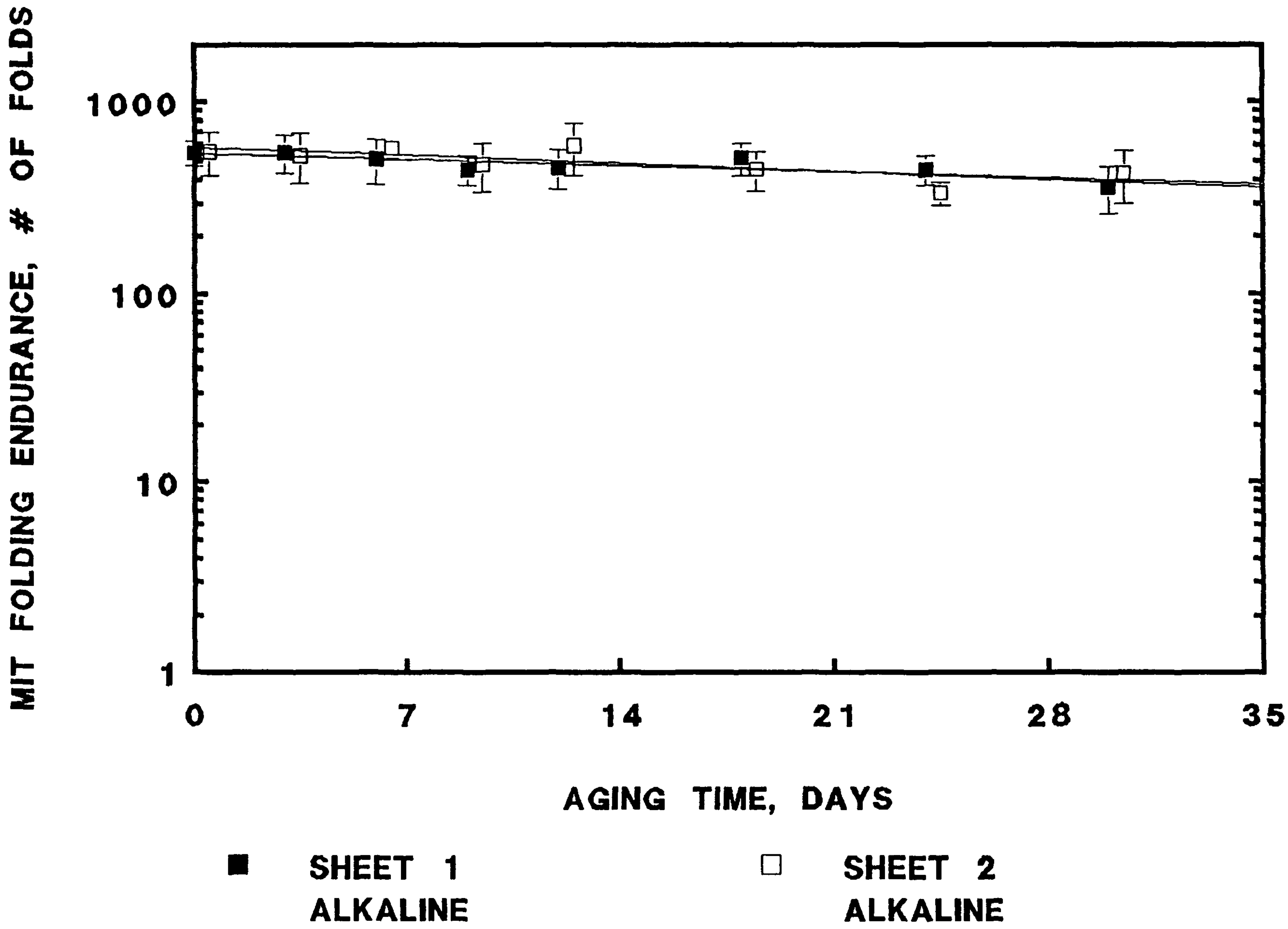



LIBRARY OF CONGRESS
CONTROL NUMBER 303590
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET


LIBRARY OF CONGRESS
CONTROL NUMBER 303590
MIT FOLDING ENDURANCE, # OF FOLDS
1000
100
10
1
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALUM-ROSIN
SHEET 2
ALUM-ROSIN

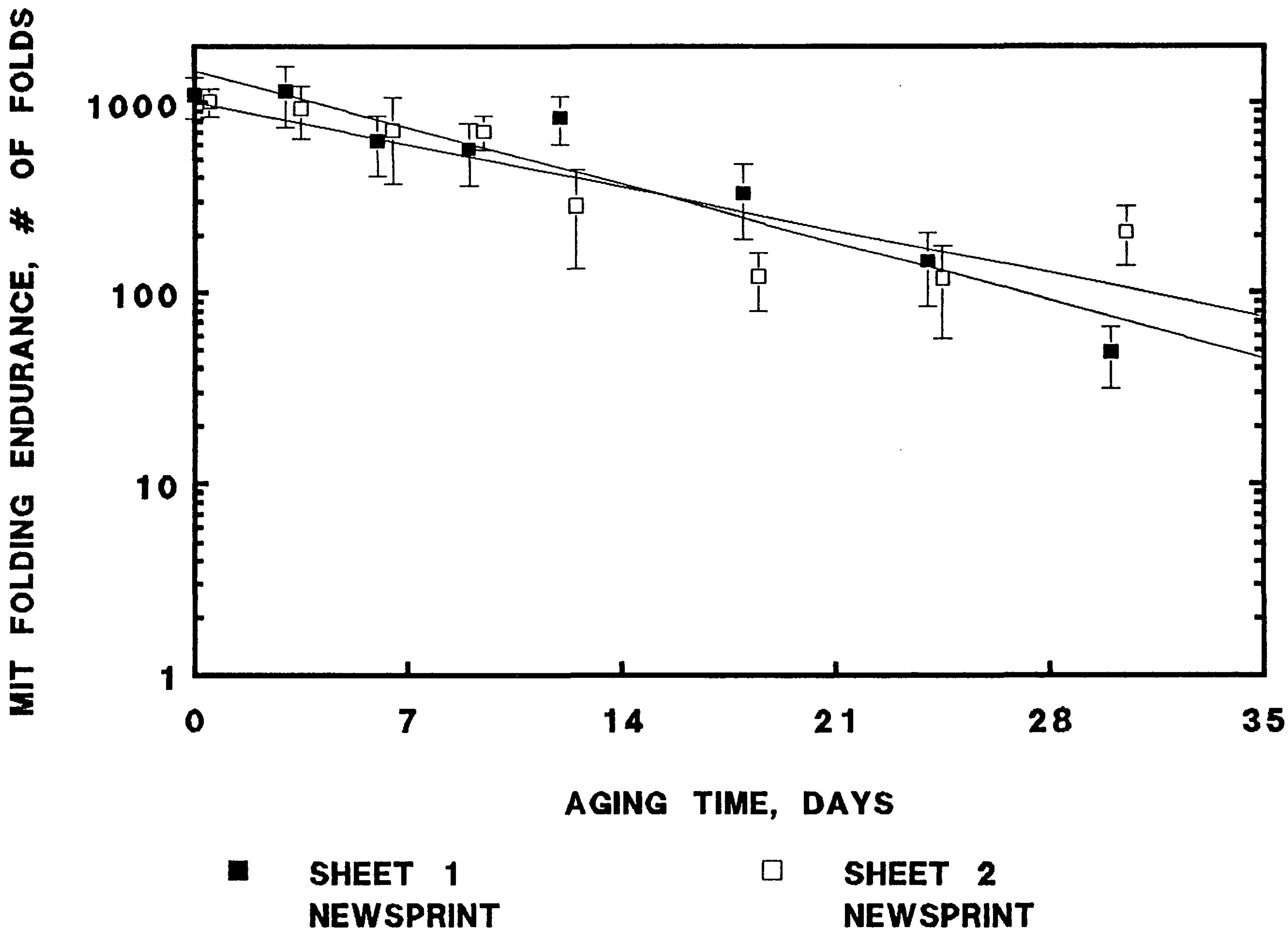
LIBRARY OF CONGRESS

CONTROL NUMBER 303590



LIBRARY OF CONGRESS

CONTROL NUMBER 303590



LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.45	3.01	3.80	4.77	78.49	118.91
2	2.53	3.01	4.51	4.78	93.81	117.01
3	2.63	2.99	4.90	4.43	107.82	109.43
4	2.58	2.98	4.61	4.39	98.92	108.70
5	2.54	3.05	4.37	4.88	91.63	123.43
6	2.53	2.93	4.09	4.23	87.10	102.86
7	2.53	2.97	4.43	4.58	94.40	116.14
8	2.51	2.99	4.14	4.71	85.94	116.72
9	2.57	2.99	4.54	4.63	99.21	113.36
10	2.54	2.92	4.70	4.66	98.92	110.74
Average	2.54	2.99	4.41	4.61	93.62	113.73
Std. Dev.	0.045	0.037	0.323	0.202	8.327	5.940

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.83	2.61	4.92	4.83	115.41	102.86
2	2.85	2.57	5.20	4.44	122.12	93.67
3	2.84	2.57	4.98	4.25	118.62	90.02
4	2.79	2.52	4.92	3.96	115.26	81.27
5	2.79	2.58	4.43	4.50	101.40	97.32
6	2.79	2.65	4.84	5.23	113.80	116.87
7	2.73	2.54	4.10	4.19	94.25	87.98
8	2.77	2.51	4.57	4.18	103.88	85.50
9	2.82	2.50	5.31	4.15	125.77	85.79
10	2.78	2.54	5.40	4.69	127.22	97.90
Average	2.80	2.56	4.87	4.44	113.77	93.92
Std. Dev.	0.036	0.047	0.405	0.383	10.826	10.443

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.87	2.53	4.51	4.28	108.11	88.85
2	2.86	2.50	4.16	4.13	97.75	86.08
3	2.88	2.56	4.38	4.55	102.42	97.75
4	2.81	2.49	3.95	4.15	91.19	84.62
5	2.71	2.58	3.24	4.63	71.78	98.19
6	2.86	2.57	4.38	4.67	103.01	98.63
7	2.92	2.46	4.59	3.69	111.03	76.01
8	2.88	2.63	4.28	4.85	99.94	104.90
9	2.97	2.52	4.81	4.26	117.30	89.29
10	2.95	2.54	4.46	4.59	108.11	98.77
Average	2.87	2.54	4.28	4.38	101.06	92.31
Std. Dev.	0.071	0.049	0.433	0.343	12.628	8.750

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.33	2.08	3.43	3.22	62.15	52.09
2	2.29	1.93	3.21	2.60	56.90	38.96
3	2.39	1.90	4.00	2.40	74.55	35.60
4	2.03	1.99	2.29	3.08	36.33	48.73
5	2.14	1.95	2.87	2.73	47.56	41.58
6	2.33	1.94	3.81	2.74	69.16	41.14
7	2.18	2.01	2.94	3.21	49.59	49.61
8	2.29	2.01	3.36	2.85	59.26	44.06
9	2.30	1.99	3.16	2.82	56.10	44.79
10	2.22	2.01	2.95	3.13	50.89	48.00
Average	2.25	1.98	3.20	2.88	56.25	44.46
Std. Dev.	0.108	0.051	0.490	0.275	11.012	5.204

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.14	2.08	3.38	3.51	57.05	57.48
2	2.21	2.06	3.81	3.18	67.70	52.38
3	2.11	2.16	3.36	3.59	55.88	61.13
4	2.19	2.16	3.91	3.80	67.26	64.34
5	2.05	2.16	3.03	3.89	49.02	65.95
6	2.06	2.04	2.91	3.19	47.86	50.63
7	2.13	2.13	3.39	3.66	57.19	61.57
8	2.11	2.06	3.24	3.14	53.98	51.50
9	2.09	2.13	3.09	3.54	51.21	59.67
10	2.04	1.92	3.01	2.56	48.73	38.23
Average	2.11	2.09	3.31	3.41	55.59	56.29
Std. Dev.	0.058	0.077	0.334	0.395	7.144	8.292

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.10	2.04	3.51	3.19	58.13	50.71
2	1.99	2.18	2.66	4.00	42.22	68.41
3	2.04	2.09	2.77	3.43	44.40	57.53
4	2.12	2.02	3.51	3.00	58.67	47.43
5	1.98	2.08	2.70	3.38	41.70	55.91
6	2.09	2.13	3.50	3.47	57.37	57.60
7	1.99	1.97	2.81	2.49	43.81	37.83
8	2.07	2.22	3.32	3.75	54.60	65.54
9	2.07	2.09	3.48	3.17	56.73	51.62
10	1.90	2.13	2.78	3.86	41.25	64.66
Average	2.03	2.09	3.10	3.37	49.89	55.73
Std. Dev.	0.068	0.075	0.385	0.444	7.727	9.279

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	3.84	3.76	4.05	3.88	117.19	110.10
2	3.91	3.87	4.23	4.25	125.20	125.11
3	3.90	3.73	4.27	3.71	126.52	104.74
4	3.83	3.93	4.17	4.43	120.60	130.74
5	3.76	3.83	3.89	4.08	110.97	117.67
6	3.58	3.63	3.28	3.35	89.48	91.33
7	3.68	3.92	3.54	4.39	98.91	131.15
8	3.77	3.77	3.87	4.03	110.04	115.96
9	3.81	3.77	3.94	3.97	115.22	114.06
10	3.78	3.84	4.25	4.32	121.42	126.57
Average	3.79	3.80	3.95	4.04	113.55	116.74
Std. Dev.	0.099	0.093	0.326	0.335	11.759	12.528

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	3.76	3.51	4.10	3.90	116.06	104.51
2	3.80	3.47	4.12	3.77	118.27	99.33
3	3.90	3.61	4.47	4.18	131.73	115.45
4	3.97	3.68	4.72	4.40	141.90	125.52
5	3.87	3.67	4.50	4.38	131.32	122.41
6	3.92	3.62	4.60	4.06	137.26	112.97
7	3.92	3.68	4.62	4.20	138.53	117.46
8	3.88	3.78	4.57	4.54	135.86	131.72
9	3.84	3.58	4.41	3.98	128.19	109.02
10	3.88	3.52	4.73	4.29	139.22	115.67
Average	3.87	3.61	4.48	4.17	131.84	115.41
Std. Dev.	0.063	0.095	0.224	0.244	8.774	9.694

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	3.77	3.58	4.46	3.75	127.66	102.25
2	3.73	3.62	4.21	4.13	120.48	114.84
3	3.71	3.58	4.10	3.96	116.06	107.89
4	3.60	3.60	3.88	4.02	102.99	109.92
5	3.77	3.67	4.35	4.00	125.23	112.50
6	3.77	3.73	4.11	4.19	117.83	119.71
7	3.73	3.48	3.84	3.35	108.13	89.09
8	3.91	3.57	4.34	3.64	129.41	99.65
9	3.76	3.59	4.01	3.61	114.93	98.51
10	3.69	3.68	3.75	4.13	105.56	117.48
Average	3.74	3.61	4.10	3.88	116.83	107.18
Std. Dev.	0.077	0.069	0.238	0.278	9.184	9.670

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.64	2.61	1.13	1.12	18.28	17.67
2	2.11	2.70	0.78	1.18	9.51	19.16
3	2.56	2.65	1.15	1.16	17.96	18.88
4	2.62	2.77	1.26	1.32	20.24	22.82
5	2.42	2.71	1.03	1.19	14.93	19.75
6	2.58	2.77	1.16	1.31	18.38	22.61
7	2.65	2.51	1.21	1.02	19.78	15.48
8	2.62	2.80	1.12	1.34	17.71	23.59
9	2.68	2.73	1.24	1.27	20.29	21.55
10	2.37	2.73	1.05	1.21	15.10	20.11
Average	2.53	2.70	1.11	1.21	17.22	20.16
Std. Dev.	0.176	0.087	0.138	0.100	3.293	2.533

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.58	2.47	1.25	1.18	19.90	18.24
2	2.60	2.62	1.30	1.24	21.14	20.59
3	2.72	2.47	1.28	1.11	21.68	16.97
4	2.86	2.63	1.40	1.29	25.02	21.30
5	2.66	2.58	1.30	1.18	21.51	18.70
6	2.78	2.71	1.36	1.30	23.94	22.25
7	2.65	2.74	1.35	1.28	22.48	22.05
8	2.63	2.37	1.33	1.05	21.70	15.52
9	2.35	2.54	1.07	1.19	15.44	18.97
10	2.55	2.50	1.28	1.16	20.11	18.06
Average	2.64	2.56	1.29	1.20	21.29	19.26
Std. Dev.	0.139	0.117	0.090	0.080	2.590	2.229

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 0 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	11	16	11	16	11	16
Specimen Number						
1	2.47	2.67	1.14	1.18	17.14	19.51
2	2.49	2.52	1.20	1.08	18.24	16.43
3	2.53	2.72	1.11	1.23	16.92	20.89
4	2.62	2.48	1.22	0.99	19.61	14.77
5	2.69	2.52	1.27	1.02	21.11	15.63
6	2.58	2.39	1.14	0.93	17.97	13.36
7	2.67	2.59	1.30	1.10	21.58	17.33
8	2.71	2.60	1.18	1.11	19.78	17.60
9	2.68	2.53	1.13	1.11	18.35	17.20
10	2.63	2.56	1.14	1.06	18.03	16.30
Average	2.61	2.56	1.18	1.08	18.88	16.90
Std. Dev.	0.088	0.093	0.063	0.087	1.587	2.181

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.50	2.85	4.25	3.96	88.97	94.28
2	2.47	2.88	3.98	3.91	81.18	92.52
3	2.42	2.89	3.45	4.14	68.32	98.06
4	2.47	2.90	3.85	4.45	79.31	107.76
5	2.51	2.88	4.31	4.13	90.46	98.45
6	2.51	2.86	4.02	3.98	84.18	95.23
7	2.48	2.88	3.97	4.14	82.56	99.78
8	2.49	2.87	3.86	4.26	80.33	101.25
9	2.56	2.84	4.28	3.86	92.41	89.80
10	2.42	2.81	3.47	3.77	68.66	89.10
Average	2.48	2.87	3.94	4.06	81.64	96.62
Std. Dev.	0.042	0.029	0.306	0.203	8.219	5.660

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.73	2.52	3.19	4.09	70.94	83.82
2	2.86	2.56	4.15	4.37	100.58	91.98
3	2.85	2.44	4.23	3.42	101.68	68.06
4	2.77	2.59	3.62	4.67	82.74	101.28
5	2.81	2.44	4.05	3.33	93.93	67.10
6	2.82	2.51	3.86	3.91	88.65	79.87
7	2.70	2.52	3.01	3.99	64.93	81.66
8	2.80	2.51	3.62	4.00	84.46	82.93
9	2.82	2.54	3.84	4.11	88.79	86.14
10	2.77	2.44	4.00	3.65	92.95	72.56
Average	2.79	2.51	3.76	3.95	86.97	81.54
Std. Dev.	0.050	0.053	0.402	0.408	11.829	10.545

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.76	2.60	4.43	3.97	101.75	83.98
2	2.75	2.41	4.10	2.61	93.74	51.50
3	2.80	2.55	4.68	3.60	111.34	80.38
4	2.71	2.49	4.16	3.23	95.07	67.33
5	2.73	2.54	4.18	3.82	95.59	81.30
6	2.68	2.60	3.73	3.69	86.55	79.81
7	2.73	2.46	3.91	3.41	91.86	67.76
8	2.63	2.50	3.56	3.43	78.45	69.74
9	2.72	2.42	4.02	3.16	90.39	63.17
10	2.63	2.63	3.84	3.87	84.80	84.33
Average	2.71	2.52	4.06	3.48	92.95	72.93
Std. Dev.	0.054	0.075	0.329	0.407	9.147	10.788

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	1.96	1.81	2.35	1.63	35.26	21.49
2	2.07	2.06	2.73	2.77	43.17	44.84
3	2.04	2.04	2.58	2.64	40.53	42.56
4	2.02	1.99	2.64	2.55	41.17	39.73
5	1.99	2.03	2.54	2.64	38.82	41.90
6	1.98	2.00	2.40	2.62	36.43	40.25
7	2.04	1.99	2.67	2.45	42.97	37.73
8	1.89	2.04	1.93	2.92	26.95	47.04
9	1.92	1.99	2.18	2.57	31.38	39.90
10	1.93	1.85	2.20	2.11	31.92	29.66
Average	1.98	1.98	2.42	2.49	36.86	38.51
Std. Dev.	0.059	0.083	0.258	0.369	5.461	7.569

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	1.86	2.08	2.57	3.67	37.16	61.44
2	1.94	1.87	3.21	2.46	49.21	35.21
3	1.96	1.95	3.17	3.11	49.85	48.42
4	1.86	1.99	2.54	3.45	36.83	54.71
5	1.92	1.87	2.80	2.43	42.22	35.05
6	1.92	1.99	2.97	3.25	45.29	52.76
7	1.95	1.93	2.99	2.94	47.30	44.35
8	1.94	1.94	2.96	2.91	45.13	45.26
9	1.94	1.94	2.77	2.71	42.60	40.84
10	1.94	1.87	3.14	2.60	49.33	38.66
Average	1.92	1.94	2.91	2.95	44.49	45.67
Std. Dev.	0.035	0.067	0.236	0.419	4.768	8.724

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.02	2.02	2.80	2.75	44.43	43.06
2	1.82	2.06	1.75	3.20	23.58	51.72
3	1.90	1.98	1.99	2.51	28.28	38.53
4	1.99	1.85	2.53	2.03	39.63	28.57
5	2.09	1.96	3.07	2.75	51.31	43.11
6	2.01	2.01	2.57	3.07	39.50	48.51
7	2.01	1.95	2.52	2.64	39.44	41.19
8	1.91	1.98	2.13	2.86	30.93	44.67
9	2.11	2.02	3.19	3.14	53.27	50.22
10	2.01	1.87	2.88	2.58	45.52	38.63
Average	1.99	1.97	2.54	2.75	39.59	42.82
Std. Dev.	0.087	0.066	0.469	0.347	9.675	6.763

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	3.71	3.78	4.16	3.88	119.87	111.56
2	3.81	3.89	4.41	4.16	129.82	123.42
3	3.84	3.83	4.35	3.88	128.84	113.10
4	3.73	3.64	4.01	3.44	115.90	95.87
5	3.74	3.89	4.09	4.39	118.32	130.74
6	3.68	3.82	3.88	4.07	110.87	119.42
7	3.68	3.83	3.69	4.00	104.00	118.03
8	3.83	3.85	4.40	4.16	133.02	122.60
9	3.72	3.85	3.98	4.34	114.04	128.44
10	3.53	3.74	3.59	4.04	97.15	115.58
Average	3.73	3.81	4.06	4.03	117.18	117.88
Std. Dev.	0.090	0.076	0.284	0.268	11.457	9.914

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	3.81	3.73	4.25	4.59	124.09	133.44
2	3.88	3.56	4.45	3.75	132.59	103.17
3	3.90	3.65	4.39	4.12	132.49	115.87
4	3.78	3.70	4.03	4.26	117.61	124.54
5	3.67	3.70	3.72	4.29	104.54	122.95
6	3.69	3.74	3.79	4.23	108.77	121.75
7	3.80	3.72	4.11	4.15	122.80	119.19
8	3.60	3.73	3.37	4.27	92.94	123.81
9	3.83	3.74	4.08	4.26	119.96	124.60
10	3.79	3.63	4.34	4.07	127.78	113.83
Average	3.77	3.69	4.05	4.20	118.36	120.31
Std. Dev.	0.096	0.060	0.340	0.212	12.806	8.075

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	3.62	3.61	3.57	3.53	98.63	96.72
2	3.63	3.69	3.57	3.70	99.14	104.73
3	3.70	3.65	3.78	3.51	107.47	99.81
4	3.56	3.45	3.30	3.01	89.33	78.39
5	3.60	3.64	3.41	3.72	93.87	104.03
6	3.76	3.65	3.90	3.60	112.58	100.32
7	3.61	3.57	3.27	3.32	89.85	90.84
8	3.78	3.69	3.94	3.61	115.65	102.35
9	3.78	3.68	3.92	3.47	113.54	97.24
10	3.76	3.84	4.02	4.07	116.94	120.09
Average	3.68	3.65	3.67	3.55	103.70	99.45
Std. Dev.	0.084	0.098	0.280	0.275	10.798	10.615

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.50	2.67	1.00	1.20	14.68	19.27
2	2.42	2.44	0.92	1.05	13.16	15.26
3	2.51	2.47	0.97	1.13	14.31	16.62
4	2.36	2.53	0.90	1.15	12.41	17.58
5	2.57	1.68	1.03	0.61	15.67	5.84
6	2.49	2.61	0.97	1.08	14.10	16.84
7	2.43	2.72	0.94	1.11	13.31	18.22
8	2.58	2.64	1.09	1.13	17.16	18.15
9	2.39	2.47	0.97	0.98	13.77	14.38
10	2.06	2.59	0.85	1.11	10.31	17.20
Average	2.43	2.48	0.96	1.05	13.89	15.94
Std. Dev.	0.150	0.297	0.068	0.168	1.844	3.826

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.90	2.49	1.25	0.99	22.19	14.59
2	2.82	2.51	1.24	1.00	21.18	14.98
3	2.67	2.38	1.14	0.87	18.27	12.00
4	2.72	2.58	1.16	1.01	19.26	15.55
5	2.65	2.66	1.12	1.02	18.03	16.25
6	2.63	2.65	1.08	1.02	17.00	16.28
7	2.68	2.61	1.11	1.01	17.77	15.99
8	2.80	2.50	1.25	1.01	21.36	15.17
9	2.61	2.34	1.11	0.98	17.54	13.60
10	2.69	1.96	1.19	0.74	19.49	8.40
Average	2.72	2.47	1.16	0.96	19.21	14.28
Std. Dev.	0.095	0.206	0.065	0.092	1.811	2.451

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 3 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	3	7	3	7	3	7
Specimen Number						
1	2.73	2.70	1.21	1.00	20.13	15.84
2	2.86	2.66	1.30	0.98	22.70	15.33
3	2.89	2.62	1.28	1.02	22.72	15.84
4	2.90	2.57	1.21	0.99	21.42	14.98
5	2.86	2.61	1.23	1.04	21.36	16.27
6	2.76	2.63	1.19	1.06	19.99	16.78
7	2.70	2.76	1.18	1.11	19.27	18.50
8	2.80	2.61	1.21	1.05	20.46	16.52
9	2.61	2.57	1.14	1.04	17.92	15.93
10	2.57	2.60	1.07	1.06	16.34	16.50
Average	2.77	2.63	1.20	1.04	20.23	16.25
Std. Dev.	0.114	0.059	0.063	0.039	2.014	0.963

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.78	2.61	3.64	3.63	85.02	79.62
2	2.81	2.77	3.71	4.68	87.04	112.04
3	2.71	2.73	3.00	4.50	67.13	104.49
4	2.73	2.64	3.34	3.95	73.93	87.09
5	2.82	2.60	3.88	3.32	94.54	70.79
6	2.79	2.60	3.43	3.20	78.51	70.57
7	2.79	2.75	3.49	4.27	79.65	98.16
8	2.80	2.72	3.63	4.05	84.40	90.97
9	2.71	2.63	2.75	3.46	60.78	75.53
10	2.76	2.70	3.45	3.81	80.78	86.90
Average	2.77	2.68	3.43	3.89	79.18	87.62
Std. Dev.	0.041	0.066	0.336	0.498	9.853	14.095

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.42	2.87	2.92	3.74	57.02	88.39
2	2.43	2.86	3.11	3.80	62.17	88.09
3	2.49	2.83	3.53	3.82	73.36	90.44
4	2.53	2.83	4.00	3.76	85.37	86.04
5	2.47	2.78	3.43	3.51	71.27	80.29
6	2.40	2.79	2.82	3.70	54.17	85.07
7	2.50	2.81	3.67	3.84	75.66	89.03
8	2.47	2.79	3.23	3.58	65.77	82.87
9	2.50	2.74	3.46	3.23	71.08	73.29
10	2.46	2.67	3.56	3.03	72.96	67.54
Average	2.47	2.80	3.37	3.60	68.88	83.10
Std. Dev.	0.039	0.058	0.358	0.273	9.291	7.461

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.35	2.69	3.22	3.98	61.89	89.14
2	2.32	2.70	3.00	3.90	58.24	89.07
3	2.39	2.65	3.38	3.80	67.27	83.24
4	2.45	2.60	3.84	3.22	78.39	69.97
5	2.41	2.64	3.67	3.81	76.06	84.04
6	2.43	2.68	3.73	4.09	76.12	92.60
7	2.48	2.66	3.85	3.57	78.77	81.02
8	2.36	2.71	3.02	4.14	58.51	96.02
9	2.44	2.66	3.57	3.84	73.29	87.42
10	2.41	2.65	3.38	3.98	68.05	89.96
Average	2.40	2.66	3.46	3.83	69.66	86.25
Std. Dev.	0.050	0.032	0.316	0.268	8.017	7.253

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	1.94	1.86	2.50	2.01	37.69	28.49
2	1.92	1.86	2.36	2.01	35.42	27.94
3	1.82	1.97	1.92	2.59	26.06	39.89
4	1.95	1.91	2.47	2.22	37.99	32.42
5	1.95	1.85	2.50	1.91	37.23	26.09
6	1.96	1.96	2.57	2.35	38.30	35.40
7	1.99	2.03	2.60	2.89	40.14	46.79
8	1.92	1.99	2.33	2.65	34.37	41.11
9	1.92	1.98	2.31	2.49	34.93	39.06
10	1.86	1.86	2.38	2.28	33.83	33.67
Average	1.93	1.93	2.39	2.34	35.60	35.09
Std. Dev.	0.050	0.067	0.194	0.317	3.898	6.641

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	1.90	1.92	2.66	2.75	40.05	41.74
2	1.81	1.73	2.15	1.70	30.25	22.26
3	1.87	1.85	2.48	2.22	37.10	31.85
4	1.99	1.97	2.98	2.82	47.65	43.86
5	1.85	1.88	2.12	2.39	30.33	35.67
6	1.91	1.80	2.40	1.97	35.12	26.60
7	1.89	1.89	2.45	2.29	35.50	33.24
8	1.77	1.98	1.80	2.62	23.91	41.36
9	1.95	2.00	2.55	2.67	38.28	42.28
10	1.96	1.81	2.95	2.09	45.17	29.06
Average	1.89	1.88	2.45	2.35	36.34	34.79
Std. Dev.	0.068	0.089	0.367	0.368	7.102	7.443

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	1.99	1.95	2.54	2.72	40.14	42.40
2	1.91	1.95	2.18	2.76	32.16	42.41
3	1.95	1.98	2.46	2.65	37.28	41.44
4	1.94	1.85	2.59	2.15	38.56	30.89
5	1.93	1.81	2.49	2.11	37.95	29.37
6	1.85	2.03	2.01	3.31	28.48	53.53
7	1.88	1.92	2.17	2.46	31.94	37.86
8	1.84	1.83	1.90	1.90	27.08	26.54
9	1.86	1.89	2.05	2.22	28.71	32.67
10	1.84	1.94	2.19	2.99	30.81	46.72
Average	1.90	1.92	2.26	2.53	33.31	38.38
Std. Dev.	0.051	0.069	0.244	0.441	4.763	8.507

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	3.65	3.68	3.52	3.38	99.62	95.96
2	3.73	3.79	3.90	3.61	111.57	104.60
3	3.58	3.82	3.35	3.68	91.42	106.81
4	3.64	3.75	3.65	3.54	102.06	102.04
5	3.51	3.82	3.12	3.65	84.33	107.12
6	3.75	3.84	3.78	3.78	108.32	111.83
7	3.54	3.95	3.19	4.25	85.80	128.92
8	3.66	3.88	3.64	3.67	101.84	107.79
9	3.47	3.90	2.86	3.79	75.39	113.83
10	3.73	3.80	3.75	3.76	107.12	108.80
Average	3.63	3.82	3.48	3.71	96.75	108.77
Std. Dev.	0.097	0.076	0.335	0.227	11.935	8.662

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	3.89	3.66	4.17	4.03	124.25	112.80
2	3.86	3.64	3.90	3.96	115.19	111.07
3	3.76	3.71	3.57	4.44	102.60	128.99
4	3.78	3.65	3.64	4.27	104.19	120.92
5	3.85	3.54	3.74	3.68	111.02	100.00
6	3.92	3.72	4.03	4.34	121.05	125.49
7	3.98	3.68	4.10	4.01	125.24	113.54
8	3.97	3.73	3.94	4.22	120.19	123.55
9	4.05	3.72	4.36	4.11	135.19	117.84
10	3.85	3.39	4.12	3.15	121.77	81.47
Average	3.89	3.65	3.96	4.02	118.07	113.57
Std. Dev.	0.091	0.106	0.250	0.374	10.000	14.036

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	3.64	3.80	3.75	4.04	104.26	119.59
2	3.61	3.75	3.77	3.89	104.39	111.77
3	3.63	3.82	3.82	4.13	106.45	123.17
4	3.74	3.83	4.17	4.16	120.34	122.57
5	3.77	3.75	4.35	3.89	129.43	112.53
6	3.66	3.85	4.07	4.46	114.52	133.05
7	3.64	3.61	3.94	3.51	110.18	99.77
8	3.62	3.67	3.80	3.74	105.88	104.79
9	3.61	3.58	3.83	3.41	107.15	95.13
10	3.46	3.71	3.34	4.07	90.22	117.93
Average	3.64	3.74	3.88	3.93	109.28	114.03
Std. Dev.	0.083	0.095	0.274	0.313	10.503	11.632

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.43	2.47	1.02	0.90	14.45	12.85
2	2.30	2.68	0.90	1.02	12.22	16.18
3	2.62	2.66	1.15	1.02	18.02	16.02
4	2.49	2.40	1.09	0.84	16.34	11.56
5	2.51	2.44	1.07	0.90	15.77	12.86
6	2.68	2.52	1.15	0.97	18.56	14.51
7	2.83	2.33	1.21	0.89	20.73	11.95
8	2.68	2.40	1.17	0.99	19.00	14.05
9	2.78	2.29	1.15	0.95	19.26	12.88
10	2.65	2.38	1.15	1.04	18.24	14.77
Average	2.60	2.46	1.10	0.95	17.26	13.76
Std. Dev.	0.163	0.130	0.091	0.068	2.553	1.605

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.42	2.61	0.97	1.02	13.88	15.70
2	2.44	2.61	0.95	1.07	13.73	16.75
3	2.22	2.60	0.86	1.07	11.28	16.82
4	2.55	2.33	1.06	0.84	16.22	11.20
5	2.48	2.75	0.99	1.13	14.43	18.86
6	2.51	2.58	0.99	1.07	14.82	16.41
7	2.45	2.55	0.96	1.08	13.87	16.59
8	2.50	2.70	1.03	1.19	15.54	19.32
9	2.47	2.33	1.02	0.94	14.91	13.03
10	2.43	2.27	1.02	0.87	14.66	11.42
Average	2.45	2.53	0.98	1.03	14.33	15.61
Std. Dev.	0.088	0.165	0.054	0.111	1.327	2.837

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 6 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	10	15	10	15	10	15
Specimen Number						
1	2.61	2.45	0.97	0.96	14.58	13.71
2	2.25	2.64	0.80	1.12	10.56	17.83
3	2.56	2.51	1.00	0.99	15.36	14.75
4	2.51	2.27	0.98	0.82	14.54	10.80
5	2.30	2.64	0.92	1.07	12.58	17.03
6	2.48	2.71	1.01	1.11	14.93	18.11
7	2.20	2.80	0.82	1.19	10.43	20.18
8	2.51	2.42	1.02	0.96	15.16	13.34
9	2.44	2.71	0.98	1.07	14.18	17.49
10	2.21	2.36	0.80	0.91	10.22	12.77
Average	2.41	2.55	0.93	1.02	13.25	15.60
Std. Dev.	0.151	0.174	0.088	0.111	2.110	2.949

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.55	2.32	3.29	3.01	69.61	57.67
2	2.47	2.37	3.07	3.68	64.72	72.51
3	2.59	2.34	4.05	3.66	87.07	71.49
4	2.45	2.27	3.20	3.25	64.34	61.45
5	2.51	2.30	3.96	3.75	82.64	69.96
6	2.43	2.22	3.57	3.33	71.21	59.70
7	2.49	2.28	4.39	4.11	90.09	76.52
8	2.44	2.33	4.12	4.39	82.65	83.24
9	2.46	2.25	3.90	3.79	78.38	70.00
10	2.42	2.24	3.55	3.59	70.28	65.42
Average	2.48	2.29	3.71	3.65	76.10	68.80
Std. Dev.	0.055	0.048	0.441	0.402	9.278	7.915

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.44	2.70	3.66	2.65	75.20	57.12
2	2.40	2.75	2.96	3.05	58.42	67.49
3	2.43	2.64	3.45	2.34	72.59	48.83
4	2.35	2.73	2.79	3.16	54.06	71.40
5	2.41	2.80	3.37	3.40	66.41	78.38
6	2.46	2.80	3.62	3.57	74.09	83.66
7	2.42	2.80	2.96	3.47	58.45	79.18
8	2.46	2.83	3.37	3.76	70.18	88.07
9	2.45	2.76	3.24	3.33	67.84	75.62
10	2.45	2.69	3.33	3.14	67.43	70.83
Average	2.43	2.75	3.27	3.19	66.47	72.06
Std. Dev.	0.034	0.061	0.290	0.428	7.238	11.923

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.32	* No Sheet	3.24	* No Sheet	62.01	* No Sheet
2	2.25		2.98		54.77	
3	2.30		3.35		63.85	
4	2.32		3.88		76.60	
5	2.32		4.01		79.24	
6	2.20		3.58		65.25	
7	2.23		3.68		68.11	
8	2.23		3.85		70.94	
9	2.20		3.59		65.42	
10	2.13		2.91		49.71	
Average	2.25		3.51		65.59	
Std. Dev.	0.063		0.377		8.992	

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	1.81	1.91	1.98	1.59	27.21	22.41
2	1.87	2.03	2.44	2.27	35.12	34.81
3	1.87	1.98	2.47	2.24	35.91	33.54
4	1.83	2.04	2.60	2.68	37.32	42.37
5	1.76	1.93	2.40	2.36	32.81	34.71
6	1.75	1.87	2.72	2.31	36.75	33.12
7	1.65	1.78	2.08	1.97	26.12	26.92
8	1.67	1.80	2.25	2.14	28.60	29.59
9	1.62	1.70	1.86	1.97	22.82	25.65
10	1.61	1.48	1.86	1.53	23.20	16.95
Average	1.74	1.85	2.27	2.11	30.59	30.01
Std. Dev.	0.101	0.169	0.307	0.352	5.651	7.280

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	1.88	2.04	2.33	2.22	34.55	34.93
2	1.84	2.04	1.92	2.17	26.80	33.45
3	1.88	2.07	2.11	2.51	30.60	40.97
4	1.88	2.11	2.06	2.54	29.56	41.45
5	1.92	1.99	2.42	2.00	35.63	30.29
6	1.75	2.12	1.53	2.40	19.80	39.13
7	1.90	1.85	2.31	1.35	33.99	18.03
8	1.87	2.11	2.26	2.42	32.65	40.14
9	1.83	2.01	2.16	1.88	30.95	29.98
10	2.01	1.88	2.18	2.43	33.78	36.17
Average	1.88	2.02	2.13	2.19	30.83	34.45
Std. Dev.	0.065	0.092	0.254	0.368	4.696	7.124

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	1.81	1.78	2.24	1.72	30.99	22.47
2	1.88	1.85	2.65	2.30	38.44	32.27
3	1.83	1.82	2.59	2.13	38.05	29.44
4	1.81	1.92	2.90	2.69	41.20	40.74
5	1.88	1.89	3.47	2.73	53.17	41.63
6	1.82	1.88	3.12	2.82	44.57	41.39
7	1.86	1.93	3.33	3.20	49.87	50.73
8	1.80	1.82	2.93	2.53	41.09	36.27
9	1.74	1.77	2.80	2.09	38.33	28.29
10	1.62	1.87	2.19	2.51	27.76	36.04
Average	1.80	1.85	2.82	2.47	40.35	35.93
Std. Dev.	0.077	0.053	0.424	0.427	7.695	8.162

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	3.57	3.67	3.80	3.36	103.94	94.81
2	3.72	3.78	4.00	3.76	114.91	109.05
3	3.71	3.79	3.69	3.74	104.17	109.75
4	3.60	3.76	3.61	3.83	99.55	109.31
5	3.43	3.49	3.01	3.15	77.60	83.53
6	3.36	3.47	3.42	3.71	88.63	97.39
7	3.31	3.19	3.64	3.10	91.55	74.23
8	3.20	3.18	3.75	3.51	91.93	85.76
9	3.09	3.13	3.78	3.72	89.83	88.14
10	3.04	2.91	3.69	2.81	85.60	63.63
Average	3.40	3.44	3.64	3.47	94.77	91.56
Std. Dev.	0.244	0.317	0.266	0.349	10.853	15.586

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	3.81	3.74	4.28	4.24	124.12	123.34
2	3.69	3.61	3.66	3.64	103.84	101.37
3	3.66	3.51	3.65	3.25	103.28	87.42
4	3.64	3.72	3.99	3.98	115.13	115.96
5	3.58	3.63	3.39	3.88	92.87	109.63
6	3.76	3.82	4.31	4.06	126.26	119.65
7	3.81	3.84	4.49	4.12	133.50	121.46
8	3.67	3.77	4.05	3.83	115.98	110.90
9	3.71	3.67	4.20	3.44	120.47	97.26
10	3.67	3.44	3.91	3.47	110.27	91.52
Average	3.70	3.68	3.99	3.79	114.57	107.85
Std. Dev.	0.074	0.130	0.347	0.328	12.272	12.827

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	3.65	3.66	3.49	3.70	96.64	104.07
2	3.73	3.75	3.71	3.83	105.53	109.63
3	3.70	3.80	3.73	4.00	105.54	116.33
4	3.40	3.52	3.11	3.31	79.65	87.79
5	3.50	3.34	3.56	3.06	94.72	77.47
6	3.13	3.08	2.66	2.72	63.39	62.91
7	3.11	3.27	3.02	3.84	71.02	95.10
8	3.25	3.30	4.06	4.41	101.58	112.69
9	3.10	3.13	3.61	3.96	86.36	95.62
10	3.03	3.08	3.33	3.68	76.23	85.92
Average	3.36	3.39	3.43	3.65	88.07	94.75
Std. Dev.	0.272	0.273	0.406	0.494	14.995	16.784

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.45	2.18	1.07	0.86	15.57	10.93
2	2.38	2.02	1.03	0.78	14.56	9.01
3	2.45	2.25	1.12	0.92	16.43	11.99
4	2.42	2.28	1.13	0.90	16.60	12.24
5	2.60	2.46	1.35	1.12	21.70	16.50
6	2.62	2.52	1.45	1.23	23.69	18.86
7	2.67	2.52	1.49	1.32	24.64	20.27
8	2.12	2.43	0.97	1.26	12.41	18.66
9	2.73	2.13	1.51	1.05	25.23	13.12
10	2.56	2.13	1.31	1.07	20.22	13.55
Average	2.50	2.29	1.24	1.05	19.10	14.51
Std. Dev.	0.176	0.181	0.202	0.184	4.577	3.811

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.46	2.76	0.94	1.12	13.67	18.25
2	2.55	2.66	0.95	1.09	14.23	17.30
3	2.71	2.59	1.02	1.04	16.12	16.03
4	2.60	2.60	0.95	1.07	14.45	16.38
5	2.43	2.69	0.87	1.12	12.35	18.21
6	2.56	2.37	0.97	0.93	14.51	12.67
7	2.27	2.72	0.82	1.21	10.52	19.96
8	2.34	2.56	0.87	1.04	11.67	15.60
9	2.50	2.37	1.01	0.96	14.98	13.46
10	2.33	2.65	1.00	1.09	13.92	17.23
Average	2.48	2.60	0.94	1.07	13.64	16.51
Std. Dev.	0.137	0.135	0.066	0.081	1.669	2.213

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 9 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	4	6	4	6	4	6
Specimen Number						
1	2.38	2.45	0.94	1.03	13.00	15.09
2	2.23	2.56	0.81	1.10	10.41	17.00
3	2.25	2.64	0.90	1.15	12.09	18.37
4	2.42	2.64	0.99	1.10	14.18	17.65
5	2.18	2.65	0.89	1.22	11.26	19.70
6	2.56	2.63	1.24	1.38	19.43	22.32
7	2.42	2.46	1.21	1.32	17.77	19.89
8	2.28	2.53	1.20	1.47	16.76	23.15
9	2.29	2.26	1.13	1.24	15.79	17.19
10	2.42	2.39	1.23	1.19	17.99	17.32
Average	2.34	2.52	1.05	1.22	14.87	18.77
Std. Dev.	0.116	0.130	0.163	0.136	3.129	2.510

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.62	2.37	3.58	3.54	78.65	69.49
2	2.59	2.37	3.34	3.40	72.02	67.83
3	2.59	2.36	3.26	3.23	71.96	64.59
4	2.54	2.30	2.90	2.94	61.26	54.42
5	2.59	2.41	3.15	3.78	67.73	76.03
6	2.57	2.36	3.36	2.99	74.12	59.31
7	2.51	2.44	2.58	3.86	53.56	78.23
8	2.52	2.27	2.83	2.34	57.54	45.05
9	2.59	2.35	3.19	3.00	68.14	60.17
10	2.62	2.37	3.69	3.23	81.08	63.03
Average	2.57	2.36	3.19	3.23	68.61	63.82
Std. Dev.	0.038	0.049	0.340	0.450	8.903	9.891

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.68	2.65	3.26	3.63	73.69	80.38
2	2.63	2.67	2.96	3.84	63.76	84.75
3	2.64	2.55	3.08	3.00	66.34	63.73
4	2.58	2.63	2.71	3.30	56.65	71.71
5	2.64	2.68	2.75	3.85	58.26	86.30
6	2.68	2.65	2.95	3.43	65.79	75.59
7	2.69	2.66	3.09	3.59	67.54	80.71
8	2.70	2.54	3.24	2.68	71.77	56.20
9	2.67	2.61	2.84	2.99	61.69	63.90
10	2.61	2.63	2.62	3.95	55.95	88.47
Average	2.65	2.63	2.95	3.43	64.14	75.17
Std. Dev.	0.037	0.048	0.219	0.427	6.077	10.956

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.63	2.82	3.80	3.51	83.60	81.32
2	2.67	2.80	3.71	3.40	83.24	79.41
3	2.58	2.71	3.27	2.74	70.63	61.60
4	2.60	2.70	3.38	3.00	75.50	65.29
5	2.60	2.81	3.33	3.57	72.67	82.46
6	2.56	2.81	3.18	3.60	68.72	82.84
7	2.55	2.75	3.14	2.94	67.30	64.94
8	2.56	2.80	3.24	3.27	69.99	74.98
9	2.58	2.75	3.25	3.18	68.88	72.15
10	2.52	2.73	3.20	3.46	67.93	76.39
Average	2.58	2.77	3.35	3.27	72.85	74.14
Std. Dev.	0.041	0.045	0.226	0.295	6.068	7.849

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	1.86	1.82	1.91	1.83	27.39	24.73
2	1.84	1.95	1.78	2.32	25.21	34.70
3	1.88	1.94	1.88	2.28	26.12	34.33
4	1.85	1.92	1.71	2.07	22.91	29.85
5	1.93	2.00	2.28	2.27	33.48	34.99
6	1.89	2.06	1.94	2.54	28.35	40.75
7	1.91	1.89	2.01	1.74	28.49	24.31
8	1.88	1.96	1.88	2.24	27.22	33.27
9	1.83	1.99	1.73	2.40	23.55	38.08
10	1.93	1.83	2.47	1.85	36.71	25.84
Average	1.88	1.94	1.96	2.15	27.94	32.08
Std. Dev.	0.036	0.075	0.242	0.269	4.273	5.689

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	1.76	1.85	1.95	2.48	26.29	35.86
2	1.80	1.88	2.01	2.54	28.11	36.96
3	1.83	1.88	2.20	2.55	30.93	37.31
4	1.78	1.84	1.99	2.36	26.95	33.70
5	1.83	1.87	2.24	2.55	32.01	37.88
6	1.78	1.86	1.77	2.42	23.96	34.93
7	1.89	1.85	2.51	2.25	37.13	31.79
8	1.81	1.87	2.15	2.31	29.49	33.09
9	1.86	1.87	2.41	2.41	34.77	36.01
10	1.87	1.80	2.70	2.14	39.36	29.76
Average	1.82	1.86	2.19	2.40	30.90	34.73
Std. Dev.	0.041	0.026	0.283	0.139	4.961	2.614

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	1.84	1.81	2.02	2.04	28.03	27.82
2	1.82	1.89	1.88	2.35	25.88	34.36
3	1.95	1.75	2.26	1.55	34.30	19.99
4	1.83	1.87	1.78	2.30	24.39	33.73
5	1.82	1.88	1.71	2.27	22.92	34.14
6	1.87	1.94	1.95	2.61	27.50	40.68
7	1.92	1.91	2.17	2.44	32.67	36.11
8	1.82	1.87	1.61	2.31	21.45	34.01
9	1.92	1.86	2.14	2.18	31.43	31.79
10	1.75	1.81	1.61	2.13	20.83	29.25
Average	1.85	1.86	1.91	2.22	26.94	32.19
Std. Dev.	0.060	0.055	0.235	0.283	4.712	5.561

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	3.73	3.58	3.47	3.19	99.15	87.77
2	3.91	3.76	4.09	3.77	125.78	109.57
3	3.84	3.82	3.76	3.96	113.07	116.66
4	3.90	3.79	3.99	3.89	120.44	115.14
5	3.74	3.73	3.50	3.76	100.03	107.21
6	3.83	3.86	3.88	4.01	114.72	119.59
7	3.80	3.79	3.85	3.80	112.82	111.09
8	3.75	3.89	3.65	4.24	105.57	128.64
9	3.81	3.86	3.98	3.92	120.28	117.55
10	3.75	3.66	3.75	3.41	108.58	97.49
Average	3.81	3.77	3.79	3.80	112.05	111.07
Std. Dev.	0.066	0.095	0.208	0.299	8.821	11.622

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	3.63	3.80	3.44	4.21	95.96	124.19
2	3.76	3.73	3.75	3.88	115.70	110.36
3	3.81	3.71	4.05	3.79	119.54	107.82
4	3.72	3.84	3.67	4.28	103.97	126.54
5	3.89	3.80	4.34	4.10	129.78	119.64
6	3.81	3.73	4.04	3.83	118.28	109.24
7	3.76	3.80	3.92	4.17	113.51	122.54
8	3.71	3.66	3.75	3.80	107.86	107.66
9	3.76	3.54	3.83	3.39	110.53	92.14
10	3.74	3.75	4.03	4.10	115.65	118.25
Average	3.76	3.74	3.88	3.96	113.08	113.84
Std. Dev.	0.068	0.086	0.251	0.269	9.256	10.414

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	3.81	3.75	3.41	3.45	99.18	100.04
2	3.91	3.70	3.65	3.17	110.11	88.84
3	3.91	3.76	3.82	3.32	114.27	96.35
4	4.03	3.82	4.10	3.46	126.01	101.18
5	3.84	3.56	3.41	2.67	100.74	72.00
6	3.98	3.75	4.08	3.32	125.02	96.05
7	3.86	3.78	3.74	3.48	110.20	100.35
8	3.84	3.74	3.53	3.32	103.87	95.56
9	3.91	3.86	3.85	3.67	114.84	108.07
10	3.73	3.60	3.48	3.08	99.94	84.61
Average	3.88	3.73	3.71	3.29	110.42	94.31
Std. Dev.	0.085	0.092	0.255	0.275	9.795	10.200

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.23	2.35	0.82	0.88	10.44	12.22
2	2.51	2.45	0.97	0.96	14.30	13.88
3	2.39	2.44	0.91	0.98	12.54	14.03
4	2.52	2.57	0.95	1.11	14.19	17.23
5	2.55	2.52	0.98	1.10	14.74	16.72
6	2.54	2.32	0.98	0.96	14.69	13.01
7	2.38	2.34	0.90	0.98	12.51	13.56
8	2.39	2.33	0.91	0.91	12.79	12.25
9	2.48	2.49	1.03	1.09	15.00	16.30
10	1.99	2.60	0.77	1.09	8.67	16.81
Average	2.40	2.44	0.92	1.01	12.99	14.60
Std. Dev.	0.172	0.105	0.079	0.082	2.075	1.967

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.70	2.59	1.07	0.99	17.14	15.07
2	2.62	2.49	1.02	1.02	15.79	14.88
3	2.75	2.32	1.12	0.96	18.62	13.14
4	2.79	2.58	1.16	1.09	19.71	16.88
5	2.57	2.34	1.08	0.99	16.50	13.49
6	2.58	2.45	1.06	1.12	16.36	16.46
7	2.69	2.31	1.15	1.02	18.43	13.93
8	2.61	2.28	1.03	1.01	15.84	13.50
9	2.64	2.46	1.08	1.05	17.11	15.57
10	2.66	2.31	1.17	1.02	18.84	13.95
Average	2.66	2.41	1.09	1.03	17.43	14.69
Std. Dev.	0.072	0.117	0.054	0.050	1.374	1.302

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 12 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	9	14	9	14	9	14
Specimen Number						
1	2.68	2.40	1.04	0.99	16.57	14.16
2	2.75	2.53	1.10	0.99	17.99	14.55
3	2.79	1.75	1.10	0.58	18.41	5.67
4	2.63	2.42	1.05	0.92	16.49	12.75
5	2.66	2.67	1.06	1.06	16.62	16.82
6	2.23	2.56	0.81	0.99	10.56	14.91
7	2.55	2.38	0.98	0.87	14.58	12.08
8	2.64	2.44	1.05	0.91	16.49	12.96
9	2.30	2.80	0.89	1.06	11.92	17.79
10	2.54	2.52	1.05	0.92	15.93	13.60
Average	2.58	2.45	1.01	0.93	15.56	13.53
Std. Dev.	0.181	0.279	0.092	0.138	2.522	3.284

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.44	2.65	2.37	2.70	48.22	57.69
2	2.49	2.69	2.62	2.79	54.54	60.07
3	2.42	2.69	2.14	2.99	41.46	65.64
4	2.41	2.75	2.02	3.16	40.02	72.88
5	2.47	2.75	2.49	3.06	49.74	68.63
6	2.57	2.68	3.19	2.64	67.93	57.76
7	2.57	2.74	3.15	2.83	67.70	63.25
8	2.58	2.74	3.11	2.94	66.75	66.38
9	2.53	2.74	3.01	2.90	61.80	65.25
10	2.56	2.71	3.53	2.98	74.79	65.96
Average	2.50	2.71	2.76	2.90	57.29	64.35
Std. Dev.	0.066	0.035	0.505	0.162	12.171	4.803

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.22	2.50	2.24	2.71	40.08	53.78
2	2.35	2.54	2.98	2.80	58.35	58.45
3	2.26	2.47	2.41	2.50	44.32	50.35
4	2.24	2.53	2.20	2.90	39.74	61.91
5	2.30	2.49	2.67	2.78	50.73	56.17
6	2.32	2.49	2.79	2.58	53.82	53.97
7	2.25	2.43	2.28	2.21	40.65	45.00
8	2.25	2.55	2.37	2.82	42.22	59.35
9	2.28	2.53	2.51	2.51	46.47	53.24
10	2.27	2.57	2.60	3.02	48.18	63.93
Average	2.27	2.51	2.51	2.68	46.46	55.61
Std. Dev.	0.038	0.041	0.256	0.235	6.314	5.610

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.59	2.74	3.42	3.21	74.18	74.25
2	2.56	2.65	2.98	2.47	63.50	53.03
3	2.58	2.72	3.04	3.07	63.45	67.17
4	2.59	2.69	3.17	2.87	68.18	64.14
5	2.56	2.72	3.06	3.14	65.09	71.86
6	2.64	2.71	3.48	3.17	76.71	72.53
7	2.57	2.66	2.96	2.69	62.17	57.16
8	2.52	2.68	2.64	2.75	54.52	61.04
9	2.57	2.64	3.00	2.71	63.41	59.38
10	2.53	2.59	2.71	2.62	55.94	55.47
Average	2.57	2.68	3.04	2.87	64.71	63.60
Std. Dev.	0.034	0.043	0.265	0.262	6.975	7.585

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	1.89	1.97	1.95	1.80	28.09	26.48
2	1.92	2.04	2.07	2.03	30.14	31.95
3	1.78	1.89	1.48	1.38	19.00	18.38
4	1.82	2.01	1.63	1.98	21.93	29.95
5	1.96	1.88	2.08	1.48	30.73	19.92
6	1.88	1.98	1.91	1.87	27.76	27.81
7	1.91	1.84	1.91	1.37	27.39	17.60
8	1.85	1.90	1.70	1.51	23.42	20.81
9	1.88	1.94	1.71	1.80	23.45	26.23
10	1.92	2.01	2.03	2.02	30.04	30.81
Average	1.88	1.95	1.85	1.72	26.19	24.99
Std. Dev.	0.053	0.065	0.205	0.265	3.995	5.378

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.20	1.86	2.16	1.60	38.15	21.77
2	2.27	1.92	2.57	1.78	49.37	25.53
3	2.27	1.93	2.77	2.07	52.87	31.24
4	2.22	1.91	2.36	1.80	42.41	25.52
5	2.23	1.84	2.43	1.53	44.11	20.43
6	2.22	1.95	2.30	2.01	41.32	29.85
7	2.17	1.88	1.90	1.67	31.73	23.18
8	2.26	1.88	2.65	1.76	49.24	24.67
9	2.27	1.77	2.56	1.31	47.97	16.28
10	2.17	1.82	2.04	1.56	35.60	20.70
Average	2.23	1.87	2.37	1.71	43.28	23.92
Std. Dev.	0.040	0.056	0.278	0.227	6.754	4.478

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	1.82	1.86	2.09	1.66	29.98	23.08
2	1.84	1.84	2.16	1.67	30.67	22.67
3	1.82	1.85	2.03	1.59	28.76	21.89
4	1.71	1.91	1.65	1.81	21.26	25.93
5	1.78	1.84	1.90	1.54	25.91	20.63
6	1.74	1.93	1.81	2.01	23.55	29.79
7	1.83	1.92	2.24	1.93	31.75	27.94
8	1.78	1.93	1.19	1.92	25.46	27.95
9	1.80	1.91	2.07	1.88	28.14	27.59
10	1.73	1.79	1.90	1.61	24.51	21.18
Average	1.78	1.88	1.90	1.76	27.00	24.87
Std. Dev.	0.045	0.049	0.306	0.166	3.398	3.336

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	3.67	3.67	3.36	3.69	93.96	104.77
2	3.80	3.74	3.71	3.82	108.21	109.89
3	3.72	3.66	3.32	3.56	94.50	100.39
4	3.75	3.46	3.55	2.90	103.31	76.96
5	3.79	3.58	3.56	3.28	103.30	90.39
6	3.83	3.62	3.68	3.48	108.51	98.50
7	3.90	3.66	3.93	3.67	117.49	103.34
8	3.80	3.53	3.71	3.37	107.66	92.31
9	3.72	3.62	3.35	3.53	95.43	98.50
10	3.88	3.69	4.07	3.97	121.08	113.13
Average	3.78	3.62	3.62	3.53	105.35	98.82
Std. Dev.	0.073	0.081	0.250	0.301	9.266	10.420

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	3.61	3.68	3.91	3.76	109.21	107.75
2	3.11	3.42	2.09	2.96	48.48	77.41
3	3.63	3.66	3.98	3.81	112.87	107.92
4	3.58	3.67	3.93	3.70	108.91	105.85
5	3.52	3.64	3.64	3.57	98.73	100.07
6	3.49	3.64	3.40	3.54	92.57	99.66
7	3.64	3.73	3.98	3.90	112.72	111.50
8	3.68	3.64	4.24	3.62	123.24	101.02
9	3.57	3.68	3.83	3.76	105.88	107.48
10	3.57	3.59	4.05	3.49	112.59	97.04
Average	3.54	3.64	3.70	3.61	102.52	101.57
Std. Dev.	0.162	0.084	0.611	0.262	20.742	9.664

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	3.84	3.66	3.97	3.83	118.76	109.12
2	3.81	3.52	3.89	3.26	115.35	89.19
3	3.89	3.64	4.09	3.68	124.63	104.51
4	3.82	3.61	3.81	3.71	111.60	103.98
5	3.74	3.62	3.64	3.76	105.38	106.22
6	3.90	3.51	4.11	3.33	125.77	90.66
7	3.74	3.61	3.58	3.61	104.36	101.12
8	3.76	3.37	3.62	2.62	106.35	66.98
9	3.73	3.68	3.74	3.71	109.12	105.65
10	3.74	3.58	3.99	3.24	115.80	89.22
Average	3.80	3.58	3.84	3.47	113.71	96.66
Std. Dev.	0.063	0.091	0.195	0.370	7.700	12.868

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.51	2.26	1.00	0.85	14.71	11.15
2	2.43	2.44	1.00	1.02	14.34	14.84
3	2.34	2.16	0.98	0.91	13.56	11.65
4	2.59	2.18	1.09	0.92	17.01	11.78
5	2.57	2.32	1.07	0.98	16.41	13.28
6	2.51	2.36	0.99	1.02	14.72	14.20
7	2.59	2.35	1.04	0.93	16.03	12.82
8	2.43	2.47	0.88	0.99	12.46	14.41
9	2.72	2.41	1.11	1.01	18.31	14.48
10	2.45	2.47	0.93	0.99	13.21	14.56
Average	2.52	2.34	1.01	0.96	15.08	13.32
Std. Dev.	0.108	0.112	0.071	0.058	1.837	1.385

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.05	2.38	0.77	1.00	8.69	14.08
2	2.45	2.46	1.02	1.04	14.93	15.17
3	2.36	2.47	0.91	1.02	12.67	14.79
4	2.29	2.46	0.88	0.99	11.78	14.44
5	2.29	2.18	0.88	0.83	11.55	10.59
6	2.29	2.33	0.85	0.96	11.18	13.38
7	2.37	2.40	0.91	0.98	12.43	13.69
8	2.29	2.41	0.89	1.00	11.70	14.27
9	2.31	2.33	0.97	0.96	13.27	13.30
10	1.88	2.18	0.76	0.92	8.18	11.68
Average	2.26	2.36	0.88	0.97	11.64	13.54
Std. Dev.	0.167	0.106	0.079	0.059	2.000	1.422

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 18 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	1	5	1	5	1	5
Specimen Number						
1	2.08	1.87	0.72	0.66	8.44	7.11
2	2.46	2.45	0.86	1.02	12.10	14.90
3	2.60	2.62	0.96	1.12	14.66	17.48
4	2.73	2.13	1.01	0.78	16.41	9.37
5	2.41	2.44	0.83	0.93	11.44	13.39
6	2.61	2.37	0.98	0.95	15.01	13.27
7	2.45	2.46	0.87	1.03	12.47	14.78
8	2.51	2.46	0.99	0.99	14.69	14.48
9	2.46	2.48	0.93	0.94	13.35	13.70
10	2.37	2.54	0.89	1.02	12.46	15.45
Average	2.47	2.38	0.90	0.94	13.10	13.39
Std. Dev.	0.173	0.221	0.089	0.132	2.260	3.020

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.15	2.56	2.53	2.54	45.21	53.73
2	2.11	2.57	2.02	2.38	34.81	49.47
3	2.09	2.61	1.89	2.79	30.64	60.40
4	2.10	2.54	2.08	2.33	34.14	47.23
5	2.12	2.57	2.16	2.35	36.37	47.36
6	2.07	2.56	1.88	2.34	30.97	46.80
7	2.15	2.56	2.36	2.24	40.65	44.40
8	2.14	2.65	2.35	2.92	40.97	62.90
9	2.15	2.63	2.27	2.73	38.79	57.72
10	2.13	2.61	2.44	2.79	43.01	58.68
Average	2.12	2.59	2.20	2.54	37.56	52.87
Std. Dev.	0.029	0.037	0.226	0.246	4.977	6.647

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.47	2.34	2.56	2.98	52.73	58.43
2	2.42	2.27	2.33	2.34	46.12	44.43
3	2.42	2.28	2.34	2.57	46.28	49.47
4	2.42	2.29	2.25	2.67	43.65	49.84
5	2.34	2.24	1.89	2.15	34.42	37.92
6	2.44	2.33	2.56	2.72	50.63	51.87
7	2.43	2.25	2.46	2.16	48.42	39.16
8	2.41	2.16	2.31	1.62	45.80	28.07
9	2.43	2.33	2.48	2.82	49.42	54.33
10	2.38	2.26	2.16	2.30	41.33	41.57
Average	2.42	2.28	2.33	2.43	45.88	45.51
Std. Dev.	0.036	0.052	0.205	0.401	5.224	9.059

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.40	2.25	1.82	2.48	33.66	44.94
2	2.47	2.28	2.14	2.68	43.01	50.51
3	2.43	2.21	1.98	2.16	37.66	37.76
4	2.47	2.25	2.33	2.55	45.55	46.13
5	2.48	2.23	2.32	2.44	46.10	43.48
6	2.51	2.28	2.42	2.70	49.08	49.37
7	2.46	2.30	2.13	2.75	41.25	51.25
8	2.43	2.25	2.11	2.30	40.63	43.01
9	2.45	2.30	2.14	2.47	41.71	46.26
10	2.40	2.27	2.16	2.65	41.11	47.74
Average	2.45	2.26	2.15	2.52	41.98	46.05
Std. Dev.	0.034	0.030	0.174	0.189	4.376	4.038

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	1.77	1.89	1.63	1.86	21.33	26.23
2	1.83	1.84	1.65	1.73	22.38	23.78
3	1.86	1.88	1.79	2.00	24.70	28.86
4	1.76	1.86	1.51	1.93	19.35	26.90
5	1.71	1.84	1.35	1.70	16.55	23.04
6	1.81	1.79	1.60	1.48	21.16	19.40
7	1.81	1.85	1.63	1.87	22.45	25.81
8	1.84	1.80	1.82	1.54	25.04	19.99
9	1.85	1.86	1.79	1.74	24.50	23.61
10	1.80	1.86	1.96	1.88	26.89	26.66
Average	1.80	1.85	1.67	1.77	22.43	24.43
Std. Dev.	0.048	0.033	0.173	0.168	3.038	3.053

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	1.70	1.73	1.75	1.78	23.26	23.40
2	1.70	1.81	1.58	2.27	19.83	32.52
3	1.72	1.71	1.61	1.63	20.32	20.60
4	1.75	1.79	1.82	2.10	23.87	29.27
5	1.72	1.65	1.64	1.49	20.78	18.35
6	1.80	1.71	1.79	1.57	24.16	19.59
7	1.81	1.76	2.03	2.00	28.39	26.86
8	1.75	1.68	1.68	1.57	22.24	19.83
9	1.78	1.69	1.87	1.58	25.02	19.77
10	1.68	1.59	1.63	1.29	20.29	14.34
Average	1.74	1.71	1.74	1.73	22.82	22.45
Std. Dev.	0.045	0.065	0.142	0.307	2.689	5.543

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	1.71	1.84	1.62	1.92	20.50	26.79
2	1.80	1.79	1.84	1.72	25.08	22.98
3	1.81	1.84	1.85	1.95	25.04	28.01
4	1.66	1.84	1.38	1.93	16.37	27.34
5	1.75	1.77	1.70	1.67	22.34	21.99
6	1.85	1.80	2.18	1.87	31.24	24.99
7	1.74	1.84	1.58	2.22	20.86	31.21
8	1.82	1.77	2.03	1.70	28.61	22.35
9	1.81	1.79	2.00	1.64	27.90	21.96
10	1.73	1.71	1.83	1.57	24.07	19.27
Average	1.77	1.80	1.80	1.82	24.20	24.69
Std. Dev.	0.059	0.044	0.237	0.194	4.394	3.614

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	3.52	3.42	3.22	3.38	87.61	89.82
2	3.68	3.54	3.72	3.59	106.22	99.85
3	3.64	3.60	3.51	3.84	100.53	107.73
4	3.75	3.55	3.83	3.72	112.07	102.87
5	3.75	3.55	3.99	3.72	117.96	103.63
6	3.40	3.57	2.71	3.73	70.89	104.60
7	3.54	3.66	3.13	3.91	85.94	113.19
8	3.71	3.54	3.89	3.41	112.59	94.91
9	3.63	3.50	3.61	3.36	101.69	91.20
10	3.64	3.40	4.03	3.00	113.45	80.70
Average	3.63	3.53	3.56	3.57	100.89	98.85
Std. Dev.	0.110	0.079	0.426	0.277	15.055	9.677

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	3.74	3.69	3.87	3.73	111.25	105.79
2	3.80	3.61	3.87	3.69	113.22	103.20
3	3.74	3.64	3.55	3.91	101.72	109.83
4	3.71	3.55	3.56	3.71	101.68	102.86
5	3.76	3.39	4.00	2.96	115.79	76.06
6	3.59	3.75	3.66	4.19	102.52	122.42
7	3.71	3.56	3.87	3.50	110.46	96.60
8	3.70	3.67	3.76	3.90	106.46	111.64
9	3.76	3.55	3.92	3.42	112.68	95.58
10	3.58	3.47	3.61	3.49	99.30	94.18
Average	3.71	3.59	3.77	3.65	107.51	101.82
Std. Dev.	0.071	0.109	0.161	0.336	5.882	12.438

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	3.76	3.71	3.77	3.49	109.76	100.36
2	3.71	3.54	3.62	3.34	103.73	95.10
3	3.49	3.63	2.94	3.12	78.42	86.77
4	3.54	3.75	3.06	3.70	82.81	106.80
5	3.62	3.75	3.55	3.61	98.95	103.65
6	3.61	3.66	3.32	3.37	91.89	95.45
7	3.71	3.68	3.79	3.43	109.37	96.88
8	3.61	3.79	3.50	3.64	97.02	105.73
9	3.65	3.67	3.57	3.42	100.13	96.53
10	3.27	3.58	2.65	3.29	66.62	91.81
Average	3.60	3.68	3.37	3.44	93.87	97.91
Std. Dev.	0.141	0.078	0.378	0.176	14.033	6.302

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.46	2.24	0.96	0.81	13.82	10.35
2	2.38	2.60	0.88	0.99	12.26	15.29
3	2.39	2.43	1.00	0.94	14.07	13.51
4	2.48	2.36	1.01	0.92	14.62	12.63
5	2.50	2.53	1.04	0.98	15.48	14.37
6	2.58	2.37	1.03	0.93	15.76	12.96
7	2.37	2.51	0.93	0.97	12.71	14.16
8	2.53	2.31	1.01	0.89	15.19	11.96
9	2.52	2.69	1.02	1.08	14.98	17.25
10	2.20	2.17	0.90	0.77	11.63	9.57
Average	2.44	2.42	0.98	0.93	14.05	13.21
Std. Dev.	0.109	0.163	0.056	0.088	1.429	2.269

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.47	2.21	1.04	0.88	15.16	11.36
2	2.37	2.30	0.98	0.87	13.82	11.67
3	2.16	2.19	0.83	0.78	10.18	9.75
4	2.41	2.11	0.97	0.72	13.92	8.66
5	2.46	2.28	0.99	0.81	14.40	10.74
6	2.53	2.00	1.05	0.70	15.80	8.00
7	2.54	2.26	1.03	0.82	15.71	10.81
8	2.48	2.30	1.05	0.85	15.66	11.21
9	2.48	1.62	1.00	0.52	14.72	4.78
10	2.20	1.87	0.90	0.66	11.63	6.93
Average	2.41	2.11	0.98	0.76	14.10	9.39
Std. Dev.	0.130	0.223	0.072	0.112	1.858	2.266

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 24 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	8	13	8	13	8	13
Specimen Number						
1	2.49	1.94	0.98	0.66	14.36	7.17
2	2.45	2.11	0.95	0.70	13.75	8.30
3	2.48	2.35	0.99	0.84	14.43	11.38
4	2.46	1.96	0.97	0.66	14.12	7.41
5	2.51	2.24	0.95	0.78	14.16	10.12
6	2.41	2.22	0.90	0.78	12.71	9.87
7	2.65	2.35	1.11	0.84	17.54	11.39
8	2.54	2.32	1.03	0.82	15.63	10.90
9	2.23	2.10	0.83	0.73	10.78	8.60
10	2.62	2.29	1.08	0.84	17.03	11.17
Average	2.48	2.19	0.98	0.76	14.45	9.63
Std. Dev.	0.116	0.152	0.082	0.072	1.966	1.642

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER G

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.63	2.40	2.61	2.09	59.10	40.17
2	2.59	2.47	2.60	2.38	54.29	46.50
3	2.59	2.39	2.53	2.10	52.98	40.84
4	2.58	2.37	2.47	1.87	51.59	34.07
5	2.62	2.50	2.57	2.95	55.33	61.79
6	2.63	2.48	2.74	2.37	58.68	46.79
7	2.64	2.51	2.58	2.89	55.00	60.50
8	2.65	2.35	2.72	1.60	59.44	29.03
9	2.60	2.54	2.35	3.18	48.69	67.84
10	2.58	2.49	2.72	2.67	57.70	54.58
Average	2.61	2.45	2.59	2.41	55.28	48.21
Std. Dev.	0.025	0.066	0.123	0.508	3.541	12.708

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER G

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.36	2.50	2.13	2.01	40.41	39.45
2	2.39	2.55	2.27	2.14	45.26	42.78
3	2.33	2.56	1.76	2.47	31.82	52.00
4	2.30	2.51	1.79	2.12	32.05	41.74
5	2.34	2.57	2.17	2.35	40.62	48.18
6	2.29	2.53	1.75	2.13	31.84	42.79
7	2.33	2.56	1.79	2.41	31.86	49.65
8	2.36	2.56	1.92	2.46	35.53	50.28
9	2.34	2.56	1.76	2.42	31.89	48.95
10	2.31	2.55	1.73	2.38	30.17	49.50
Average	2.34	2.54	1.91	2.29	35.15	46.53
Std. Dev.	0.031	0.022	0.204	0.169	5.140	4.374

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER G

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.36	2.43	1.72	2.30	31.12	44.35
2	2.44	2.51	2.20	2.80	42.75	58.18
3	2.40	2.46	1.89	2.34	35.60	45.36
4	2.40	2.46	1.87	2.51	34.65	49.91
5	2.37	2.45	1.85	2.39	34.16	47.71
6	2.33	2.47	1.58	2.44	28.63	48.06
7	2.33	2.43	1.60	2.25	28.28	45.62
8	2.39	2.44	1.89	2.37	35.41	47.04
9	2.42	2.50	1.98	3.01	37.98	62.37
10	2.27	2.44	1.50	2.63	25.04	52.39
Average	2.37	2.46	1.81	2.50	33.36	50.10
Std. Dev.	0.050	0.027	0.209	0.241	5.202	5.926

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER H

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	1.71	1.83	1.52	1.31	18.97	16.97
2	1.65	1.90	1.43	1.59	16.85	21.65
3	1.72	1.93	1.51	1.72	19.14	24.37
4	1.79	1.86	1.85	1.49	25.21	19.94
5	1.76	1.85	1.73	1.43	22.54	19.59
6	1.84	1.85	2.00	1.44	27.69	18.94
7	1.79	1.89	1.64	1.44	22.03	19.71
8	1.81	1.87	1.76	1.57	23.36	21.49
9	1.87	1.91	2.03	1.53	28.65	21.30
10	1.75	1.87	1.61	1.65	21.43	22.16
Average	1.77	1.88	1.71	1.52	22.59	20.61
Std. Dev.	0.063	0.032	0.206	0.121	3.799	2.033

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER H

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	1.72	1.90	1.52	1.60	18.88	22.96
2	1.72	1.90	1.66	1.62	21.18	22.47
3	1.69	1.82	1.49	1.41	18.47	18.37
4	1.71	1.75	1.53	1.15	18.85	13.96
5	1.67	1.84	1.34	1.49	15.83	19.78
6	1.73	1.82	1.59	1.32	20.08	17.06
7	1.78	1.83	1.55	1.44	19.93	19.16
8	1.69	1.86	1.26	1.43	15.07	18.85
9	1.74	1.87	1.39	1.60	17.32	22.15
10	1.75	1.73	1.63	1.15	21.61	13.60
Average	1.72	1.83	1.49	1.42	18.72	18.84
Std. Dev.	0.032	0.056	0.129	0.171	2.146	3.279

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER H

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	1.70	1.74	1.59	1.82	20.15	23.59
2	1.76	1.75	1.68	1.93	22.29	25.24
3	1.74	1.66	1.69	1.45	22.05	18.02
4	1.74	1.72	1.56	1.71	19.49	22.19
5	1.73	1.68	1.73	1.63	22.61	20.67
6	1.78	1.71	1.89	1.71	25.52	22.40
7	1.76	1.69	1.71	1.59	22.53	19.68
8	1.73	1.74	1.76	1.89	22.94	25.49
9	1.73	1.62	1.73	1.50	22.44	17.87
10	1.73	1.68	1.93	1.84	25.31	23.33
Average	1.74	1.70	1.73	1.71	22.53	21.85
Std. Dev.	0.021	0.040	0.115	0.164	1.887	2.728

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER K

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	3.80	3.58	3.88	3.29	114.78	90.97
2	3.74	3.62	3.61	3.45	104.36	96.92
3	3.76	3.43	3.68	2.75	106.73	73.07
4	3.79	3.60	3.74	3.50	109.53	98.95
5	3.85	3.59	3.86	3.48	115.39	97.29
6	3.82	3.42	3.78	2.79	112.31	73.39
7	3.85	3.31	3.76	2.30	111.74	57.06
8	3.85	3.61	3.65	2.55	107.72	98.89
9	3.73	3.58	3.43	3.29	98.77	90.22
10	3.63	3.71	3.34	3.97	93.65	114.52
Average	3.78	3.55	3.67	3.14	107.50	89.13
Std. Dev.	0.070	0.119	0.174	0.517	6.984	16.674

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER K

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	3.61	3.47	3.61	3.67	100.93	99.37
2	3.69	3.50	3.89	3.57	111.37	98.09
3	3.76	3.46	4.06	3.27	120.13	87.36
4	3.80	3.53	4.11	3.51	122.25	96.89
5	3.80	3.48	4.18	3.38	125.04	90.50
6	3.75	3.46	3.82	3.25	112.33	88.01
7	3.80	3.57	3.92	3.62	115.48	100.76
8	3.81	3.56	4.11	3.65	122.05	100.98
9	3.73	3.65	3.90	3.89	112.88	110.05
10	3.62	3.47	3.74	3.57	105.35	97.43
Average	3.74	3.51	3.93	3.54	114.78	96.94
Std. Dev.	0.076	0.061	0.183	0.194	7.780	6.858

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303595 BOOK PART LETTER K

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	3.60	3.66	3.43	3.71	96.32	105.70
2	3.55	3.40	3.15	2.75	85.35	71.55
3	3.50	3.63	2.89	3.55	76.83	99.81
4	3.56	3.48	3.13	3.13	85.98	85.64
5	3.75	3.56	3.69	3.49	106.90	95.74
6	3.63	3.51	3.29	3.29	92.41	89.03
7	3.68	3.58	3.44	3.48	96.67	95.75
8	3.69	3.58	3.51	3.58	99.43	98.73
9	3.72	3.56	3.55	3.64	101.95	100.03
10	3.61	3.25	3.35	2.67	92.33	65.98
Average	3.63	3.52	3.34	3.33	93.42	90.80
Std. Dev.	0.079	0.121	0.235	0.366	8.867	12.982

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303596 BOOK PART LETTER M

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.43	2.14	0.90	0.74	12.82	9.01
2	2.28	2.14	0.89	0.73	11.94	8.90
3	2.20	2.17	0.83	0.75	10.68	9.34
4	2.49	2.33	0.99	0.83	14.71	11.26
5	2.48	2.17	0.95	0.78	13.97	9.74
6	2.43	2.11	0.92	0.78	13.13	9.21
7	2.43	1.90	0.93	0.96	13.37	9.34
8	2.49	1.61	0.99	0.92	14.33	9.80
9	2.34	1.84	0.95	0.68	13.02	7.18
10	2.42	1.92	0.98	0.75	14.06	8.06
Average	2.40	2.03	0.93	0.79	13.20	9.18
Std. Dev.	0.096	0.210	0.049	0.087	1.202	1.078

LIBRARY OF CONGRESS

TENSILE STRENGTH DATA

CONTROL NUMBER 303592 BOOK PART LETTER M

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.30	2.62	0.51	0.97	9.47	14.63
2	2.33	2.55	0.94	0.95	12.88	14.29
3	2.38	2.38	0.97	0.87	13.69	11.82
4	2.25	2.44	0.84	0.93	10.72	13.24
5	2.42	2.28	0.94	0.88	13.26	11.69
6	2.46	2.30	1.00	0.87	14.75	12.67
7	2.42	2.40	0.98	0.92	14.14	12.86
8	2.26	2.36	0.94	0.92	12.58	12.67
9	2.18	2.50	0.88	0.96	11.04	13.95
10	2.38	2.25	1.03	0.85	14.68	12.33
Average	2.34	2.41	0.90	0.91	12.72	13.02
Std. Dev.	0.089	0.118	0.149	0.042	1.782	1.005

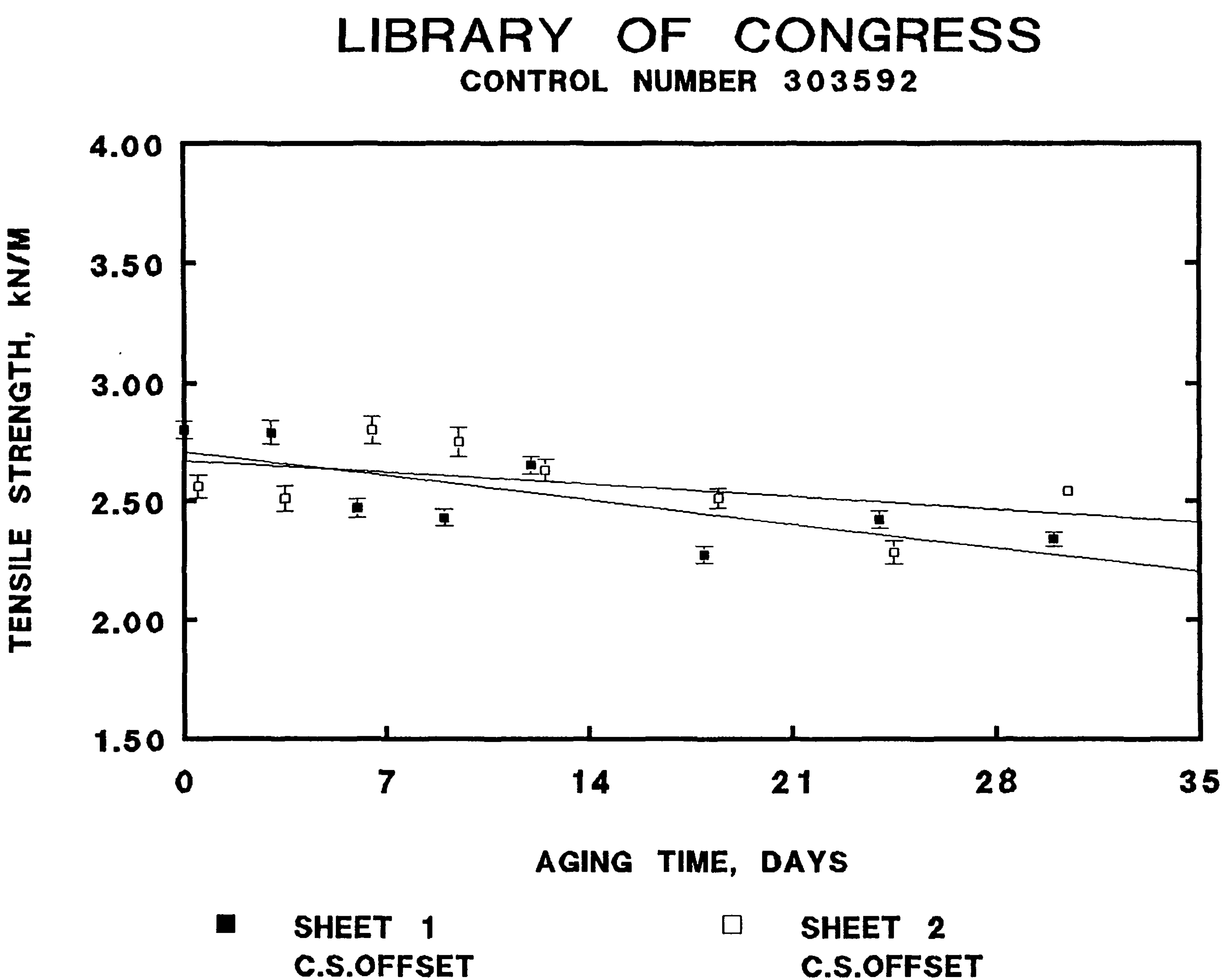
LIBRARY OF CONGRESS

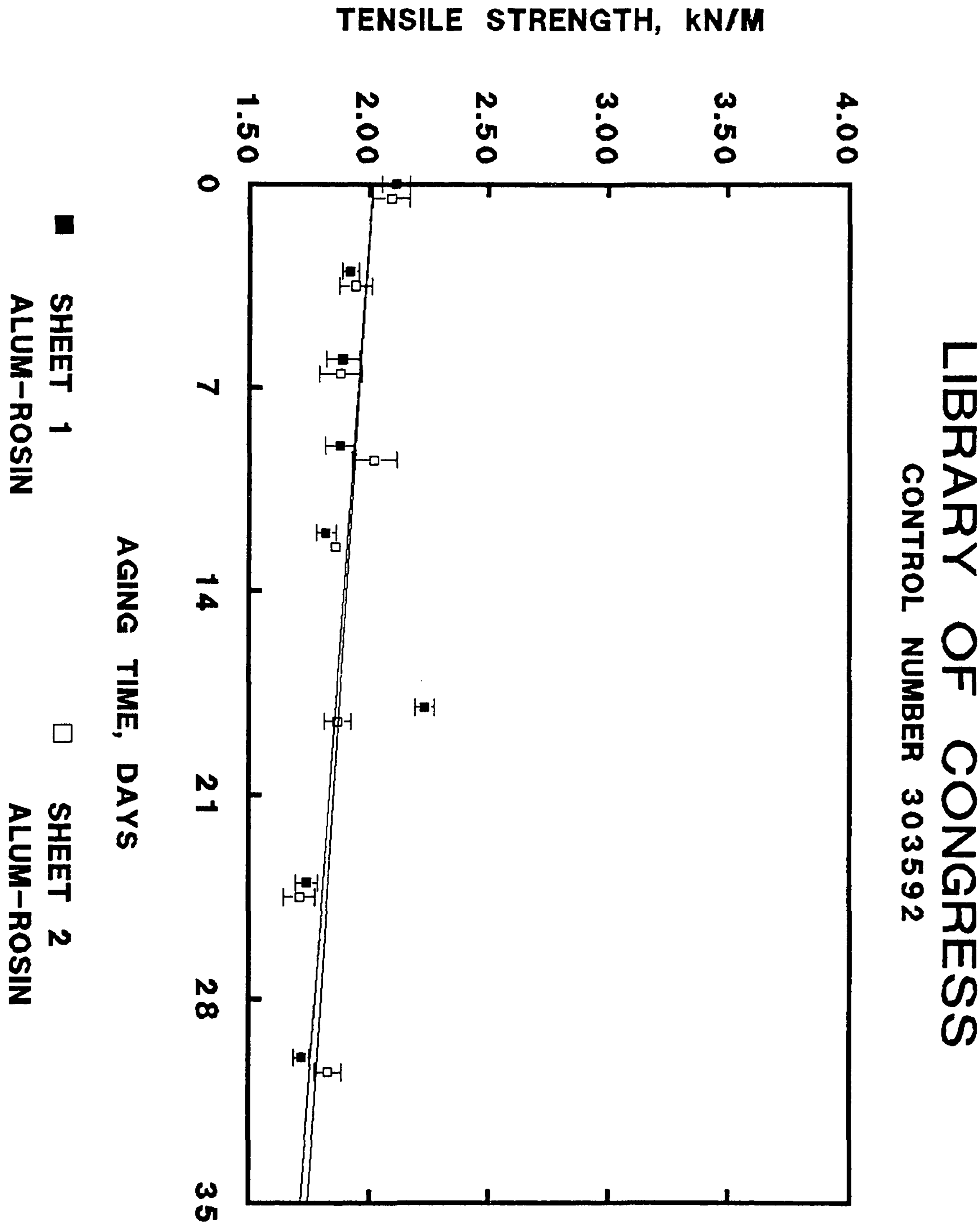
TENSILE STRENGTH DATA

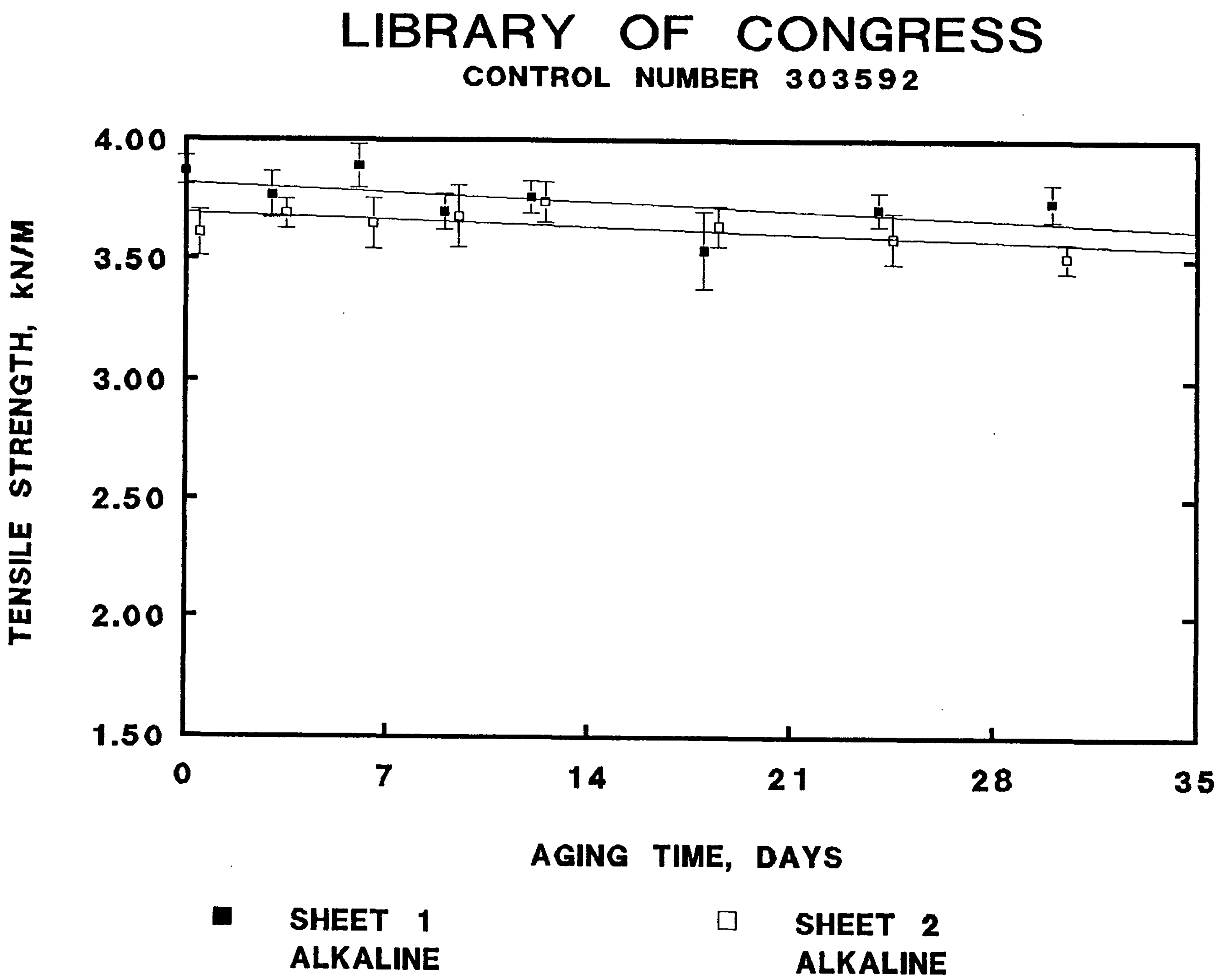
CONTROL NUMBER 303595 BOOK PART LETTER M

Aging Time: 30 days

	Tensile Strength, kN/M		Stretch, %		TEA, J/sq M	
Sheet #	2	12	2	12	2	12
Specimen Number						
1	2.56	2.36	1.01	0.87	15.39	11.98
2	2.39	2.45	0.91	0.91	12.89	13.11
3	2.14	2.61	0.76	1.00	9.11	15.61
4	2.58	2.42	0.97	0.94	14.78	13.37
5	2.35	2.43	0.93	0.97	12.85	13.87
6	2.27	2.37	0.94	0.87	12.61	11.86
7	2.45	2.47	0.99	0.95	14.05	13.86
8	2.25	2.44	0.86	0.96	11.00	13.74
9	2.31	2.48	0.85	0.97	11.39	14.05
10	2.62	2.36	1.06	0.88	16.52	12.09
Average	2.39	2.44	0.93	0.93	13.06	13.35
Std. Dev.	0.157	0.074	0.087	0.047	2.218	1.155

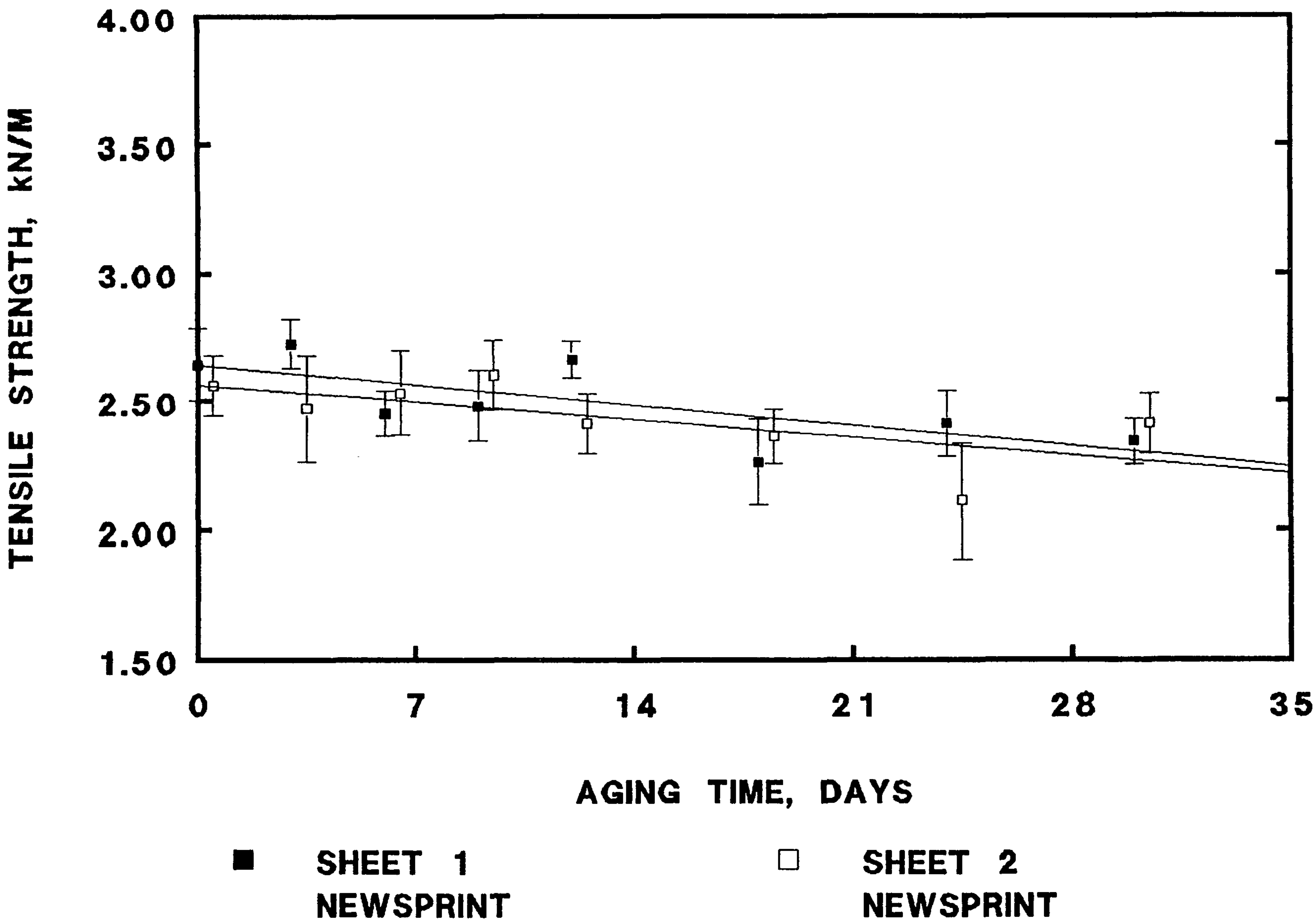

LIBRARY OF CONGRESS
CONTROL NUMBER 303592
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET


LIBRARY OF CONGRESS
CONTROL NUMBER 303592
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALUM-ROSIN
SHEET 2
ALUM-ROSIN


LIBRARY OF CONGRESS
CONTROL NUMBER 303592
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

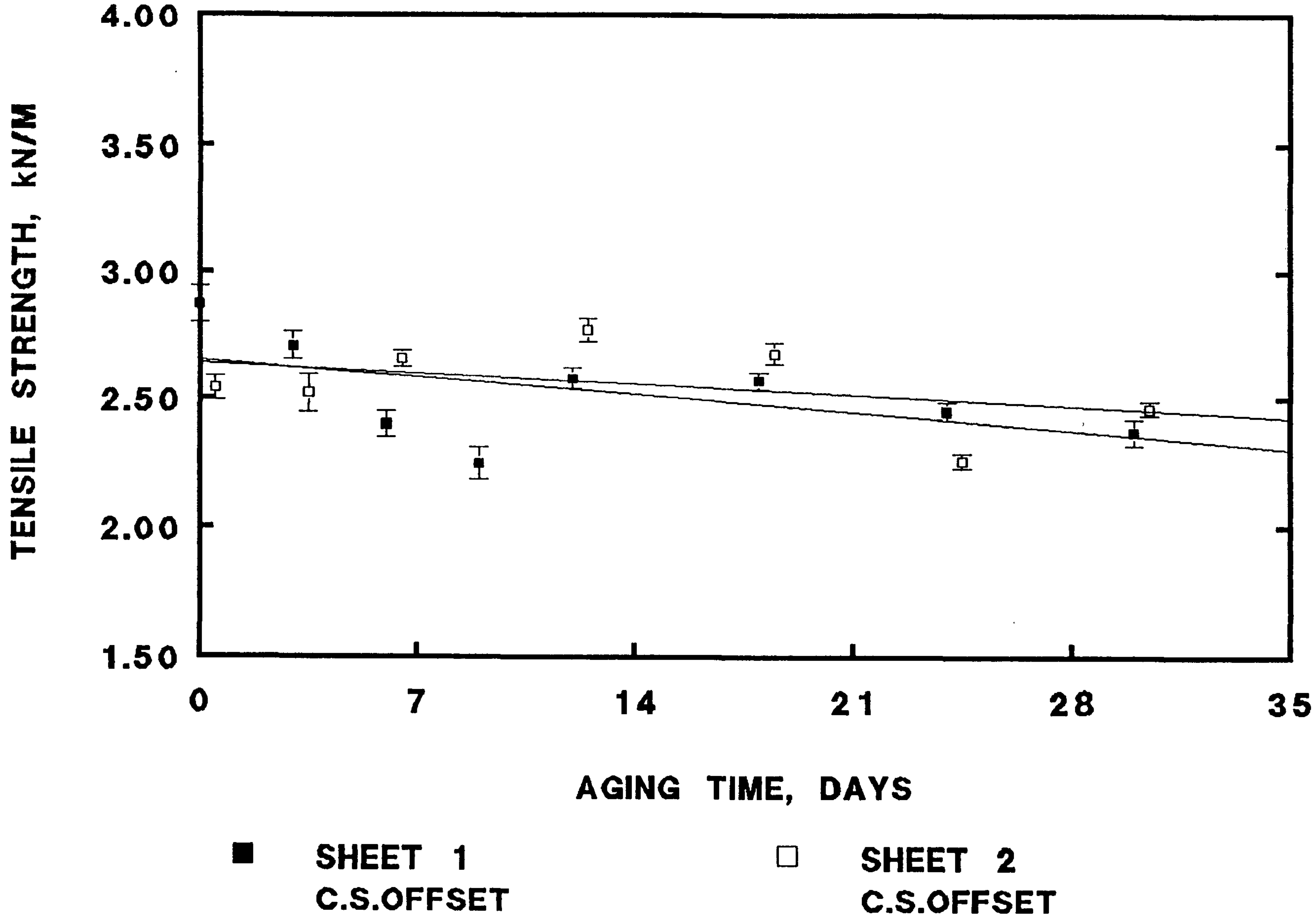
LIBRARY OF CONGRESS

CONTROL NUMBER 303592



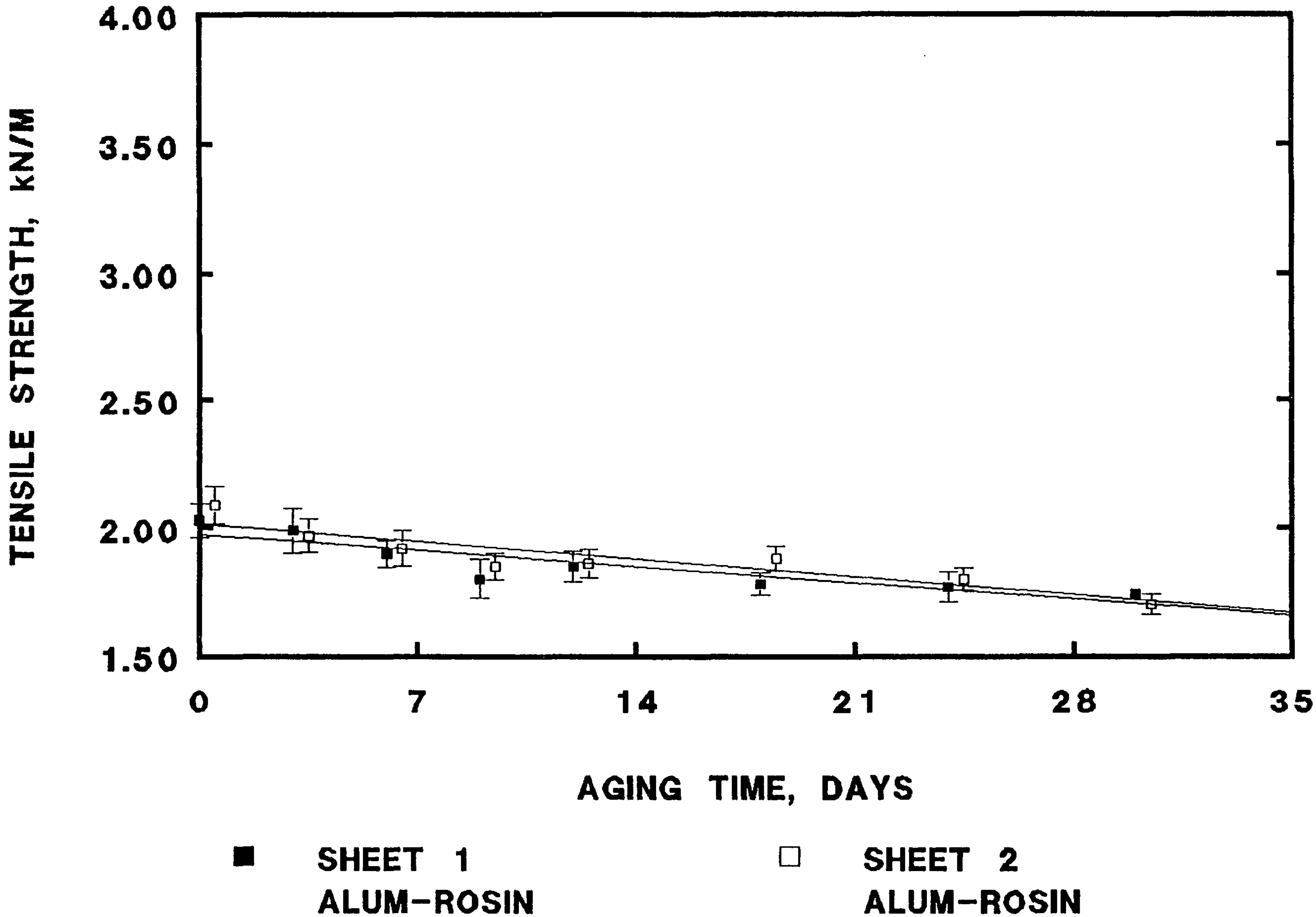
LIBRARY OF CONGRESS

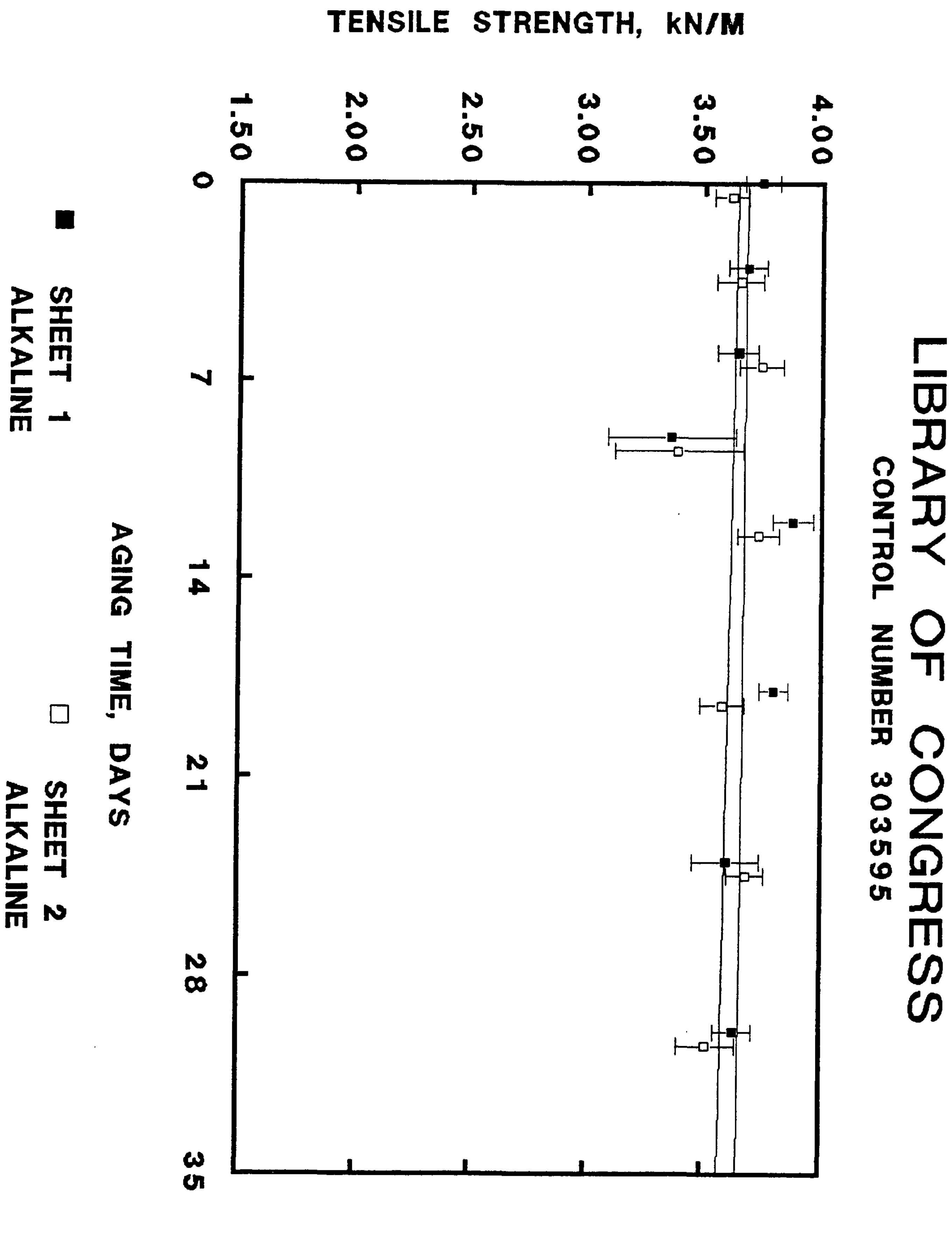
CONTROL NUMBER 303595



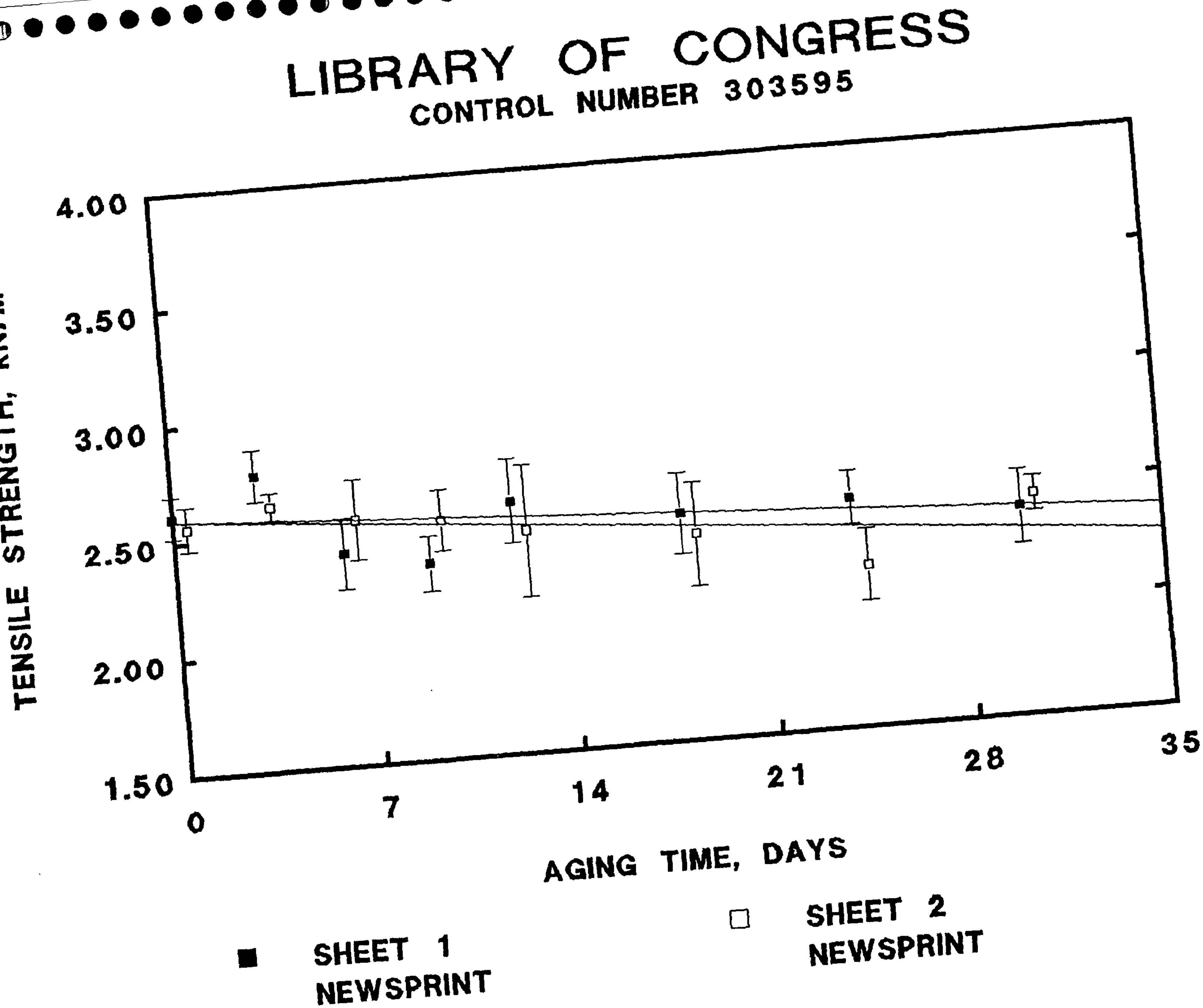
LIBRARY OF CONGRESS

CONTROL NUMBER 303595

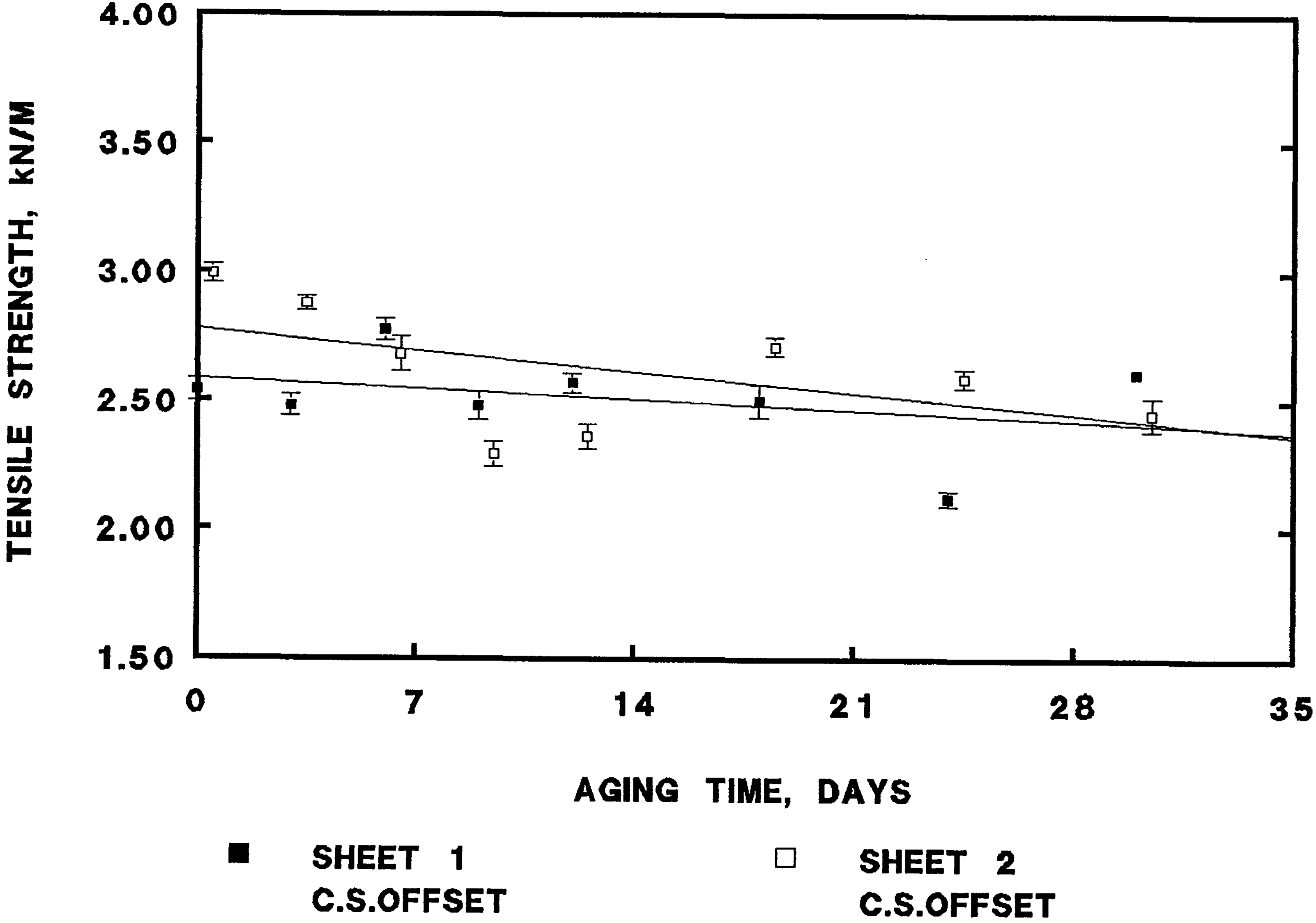




LIBRARY OF CONGRESS
CONTROL NUMBER 303595
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

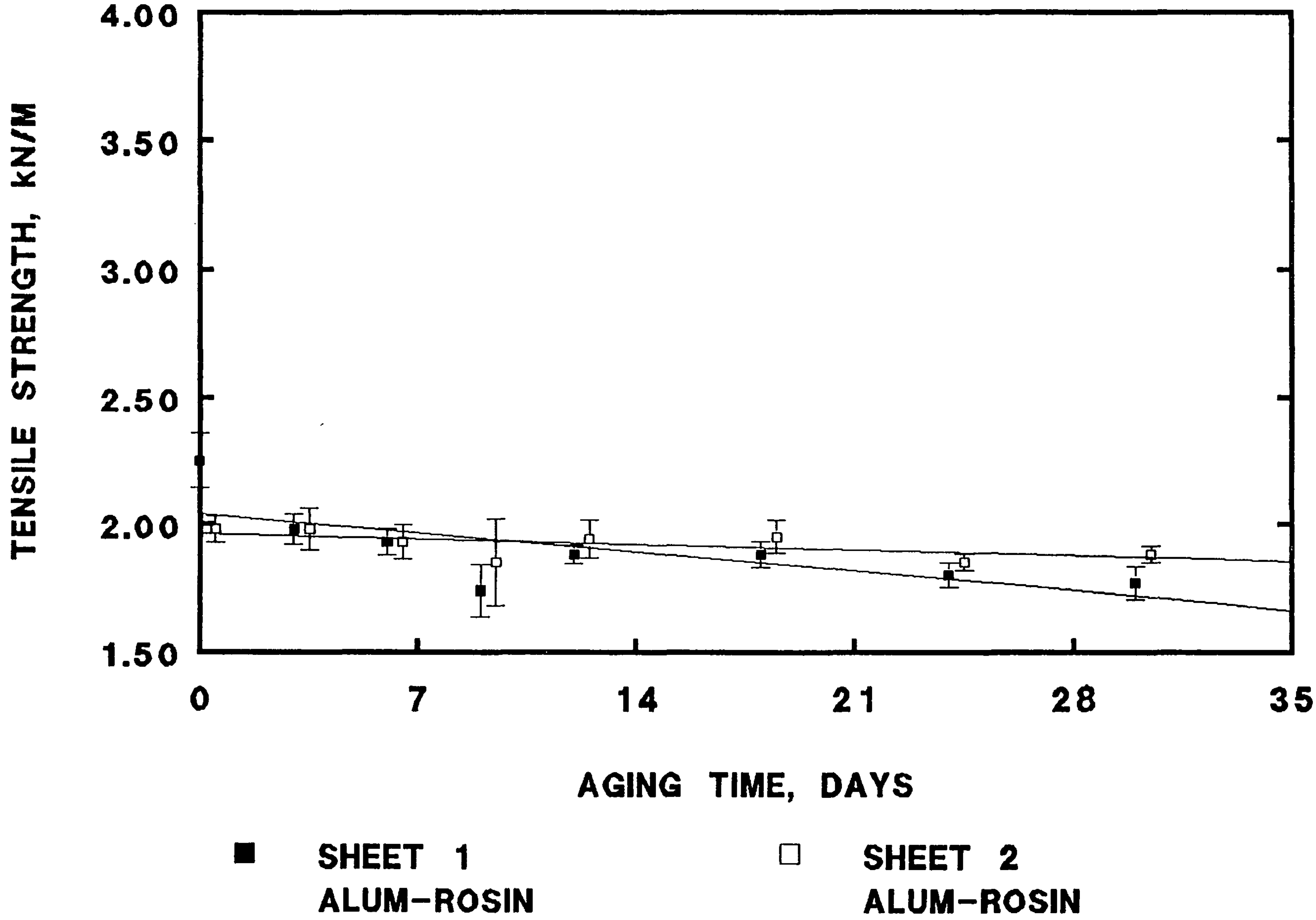

LIBRARY OF CONGRESS
CONTROL NUMBER 303595
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1 NEWSPRINT
SHEET 2 NEWSPRINT

LIBRARY OF CONGRESS
CONTROL NUMBER 303596

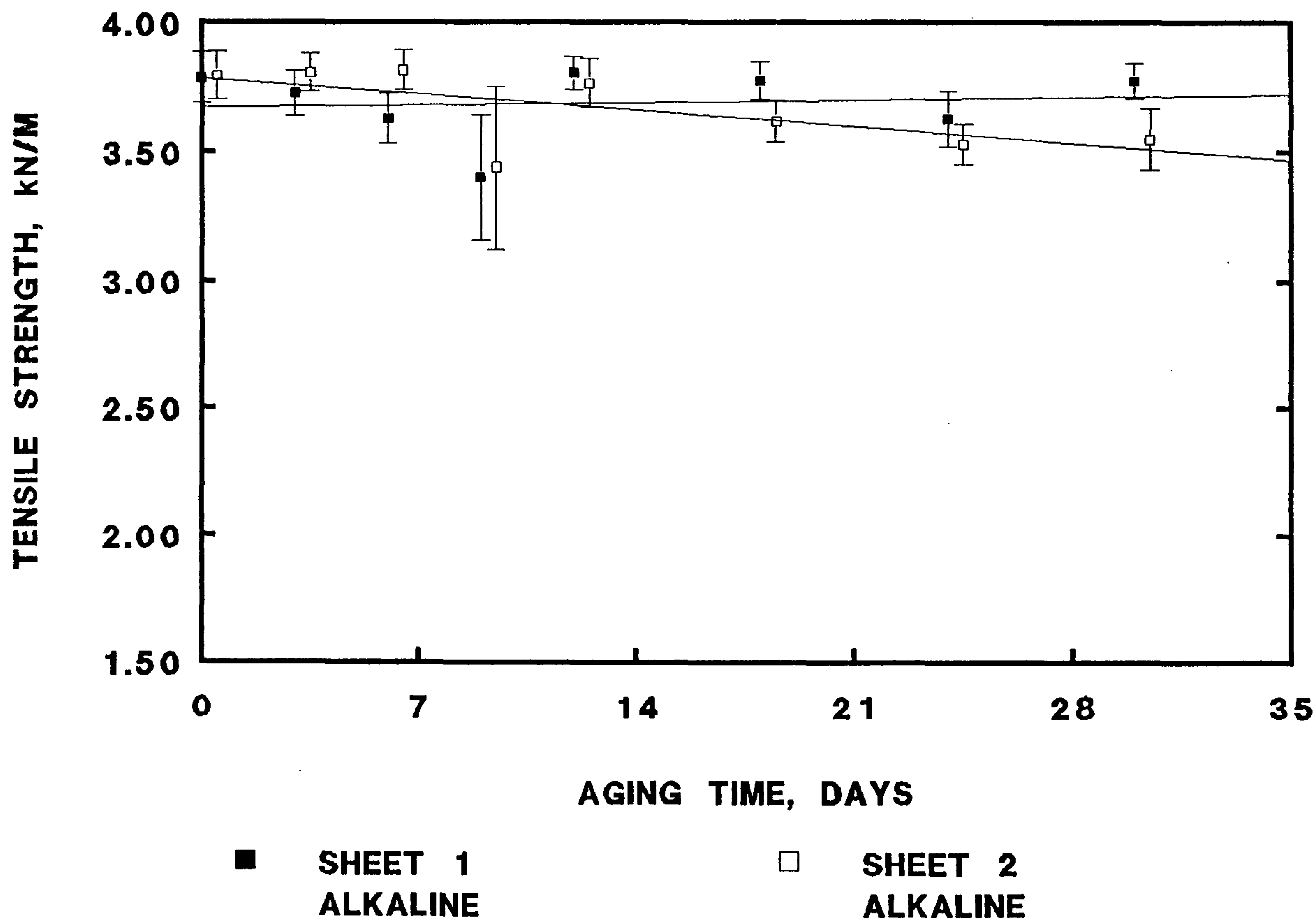


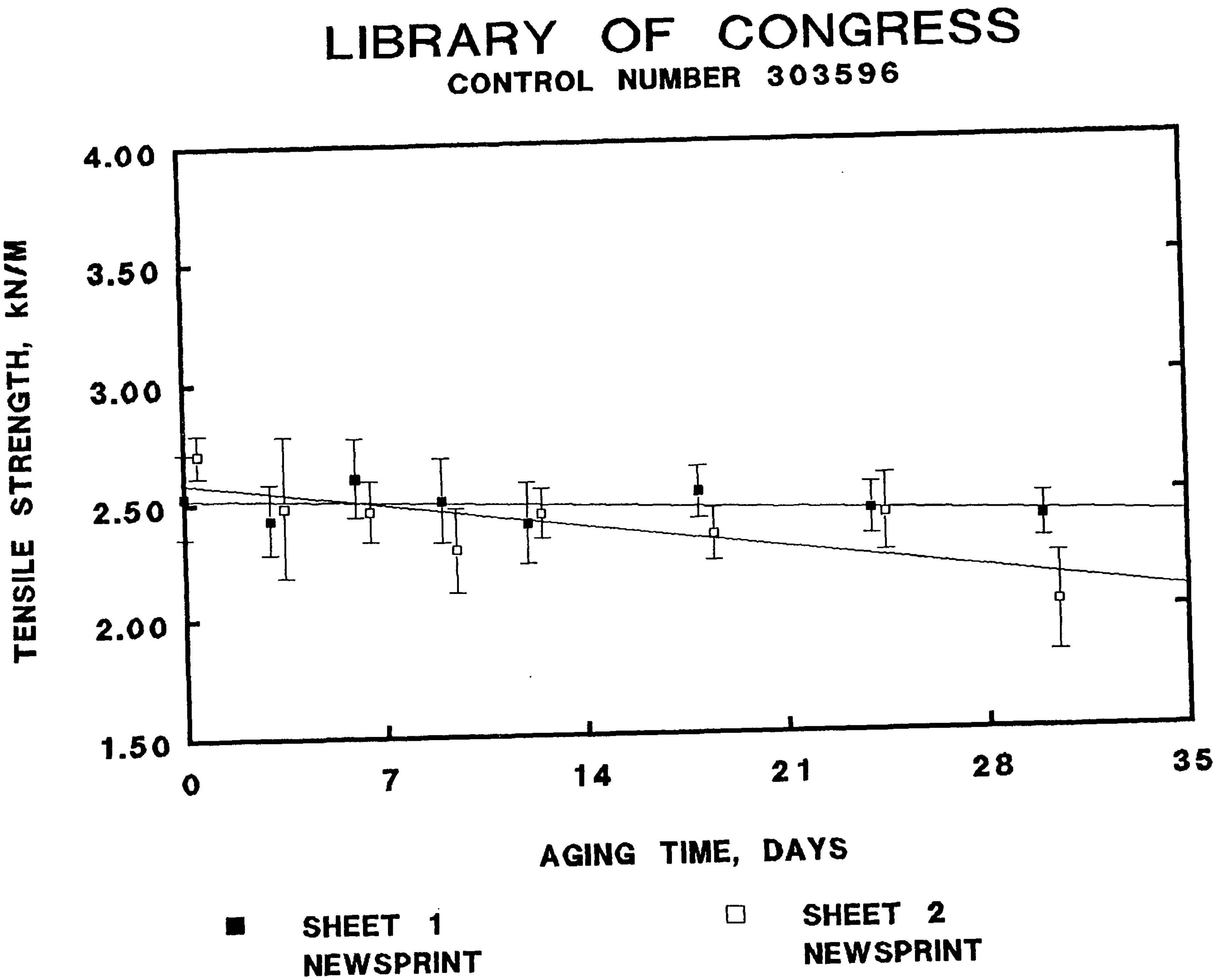
LIBRARY OF CONGRESS

CONTROL NUMBER 303596



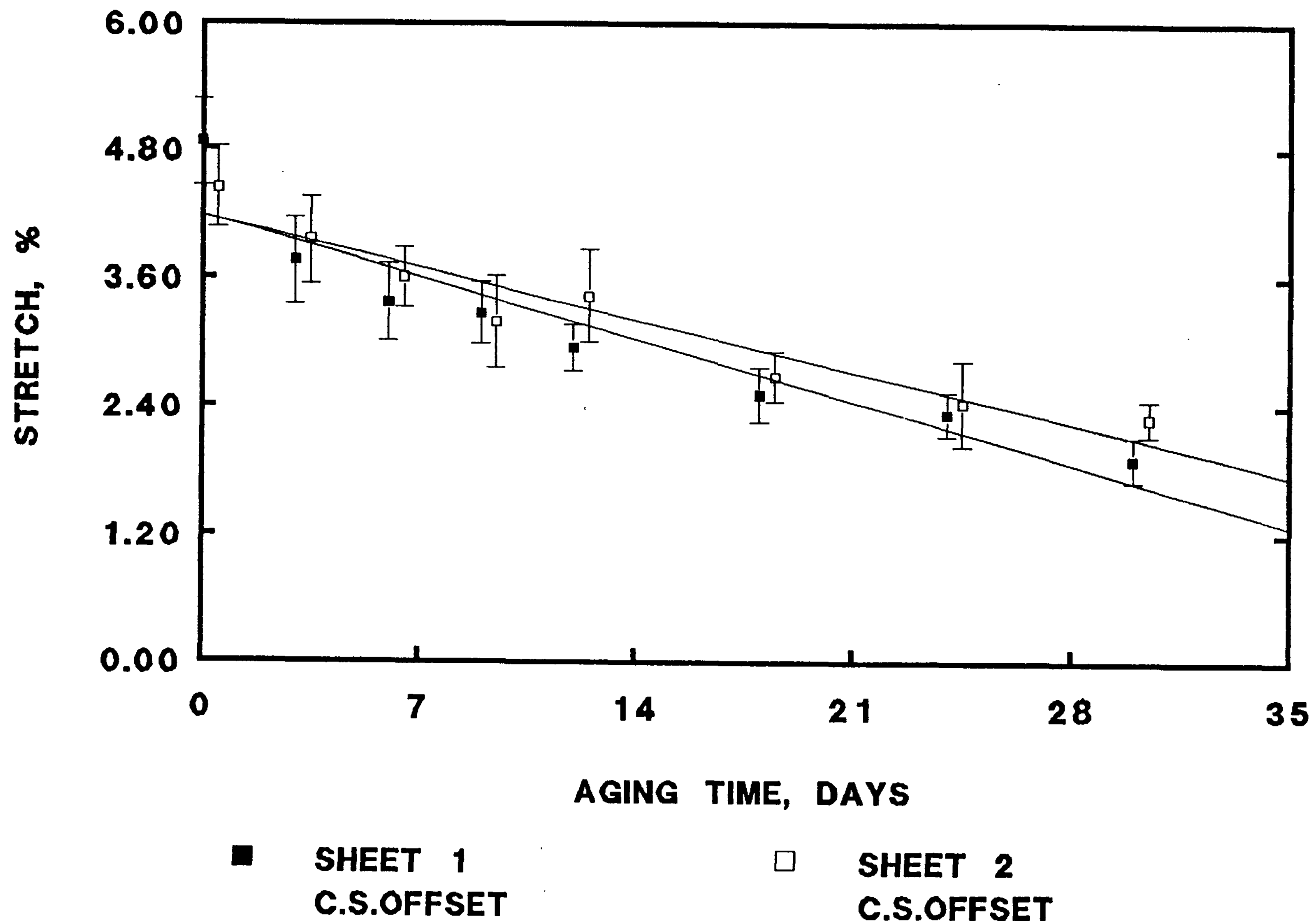
LIBRARY OF CONGRESS
CONTROL NUMBER 303596




LIBRARY OF CONGRESS
CONTROL NUMBER 303596
TENSILE STRENGTH, kN/M
4.00
3.50
3.00
2.50
2.00
1.50
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1 NEWSPRINT
SHEET 2 NEWSPRINT

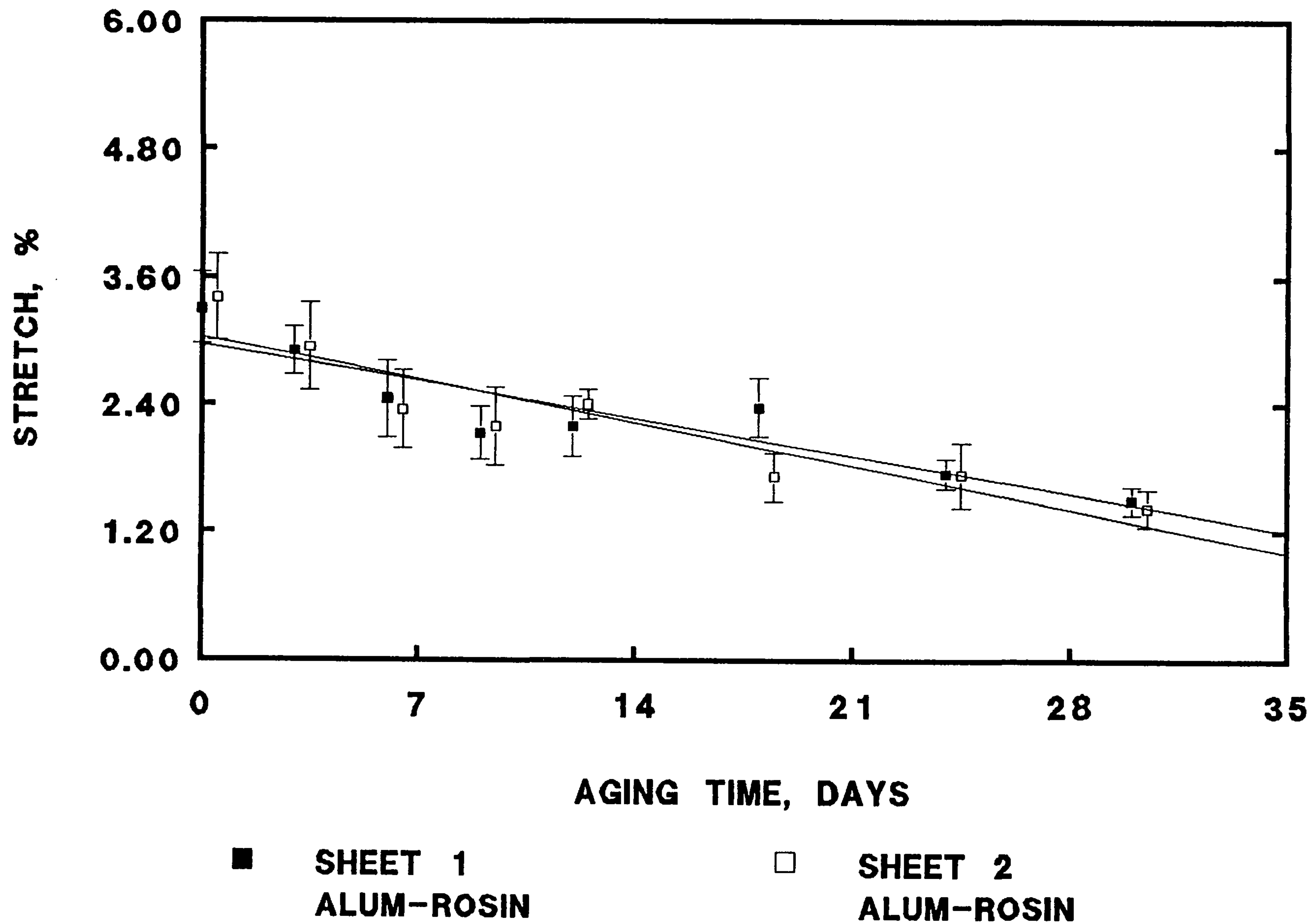
LIBRARY OF CONGRESS

CONTROL NUMBER 303592

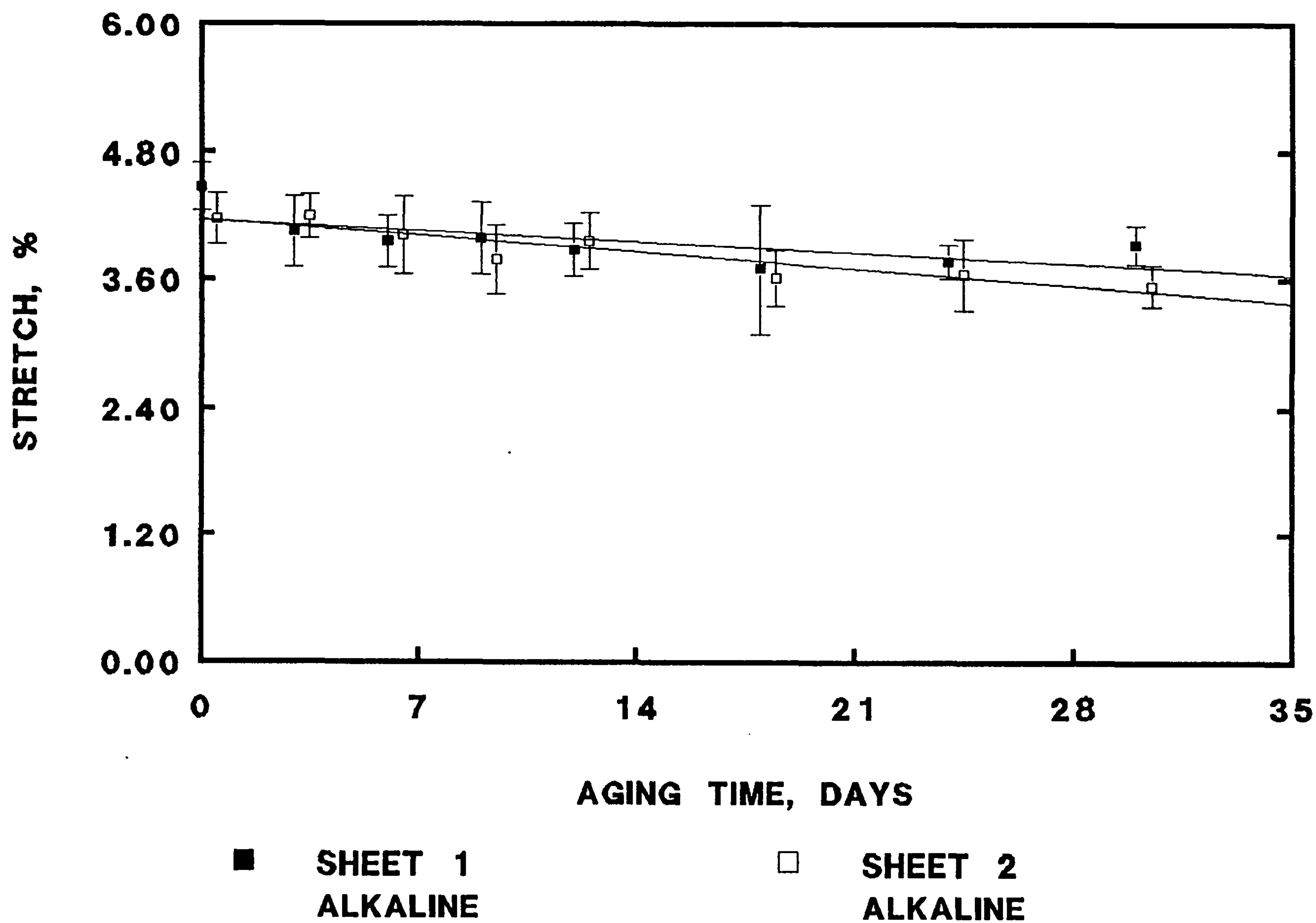


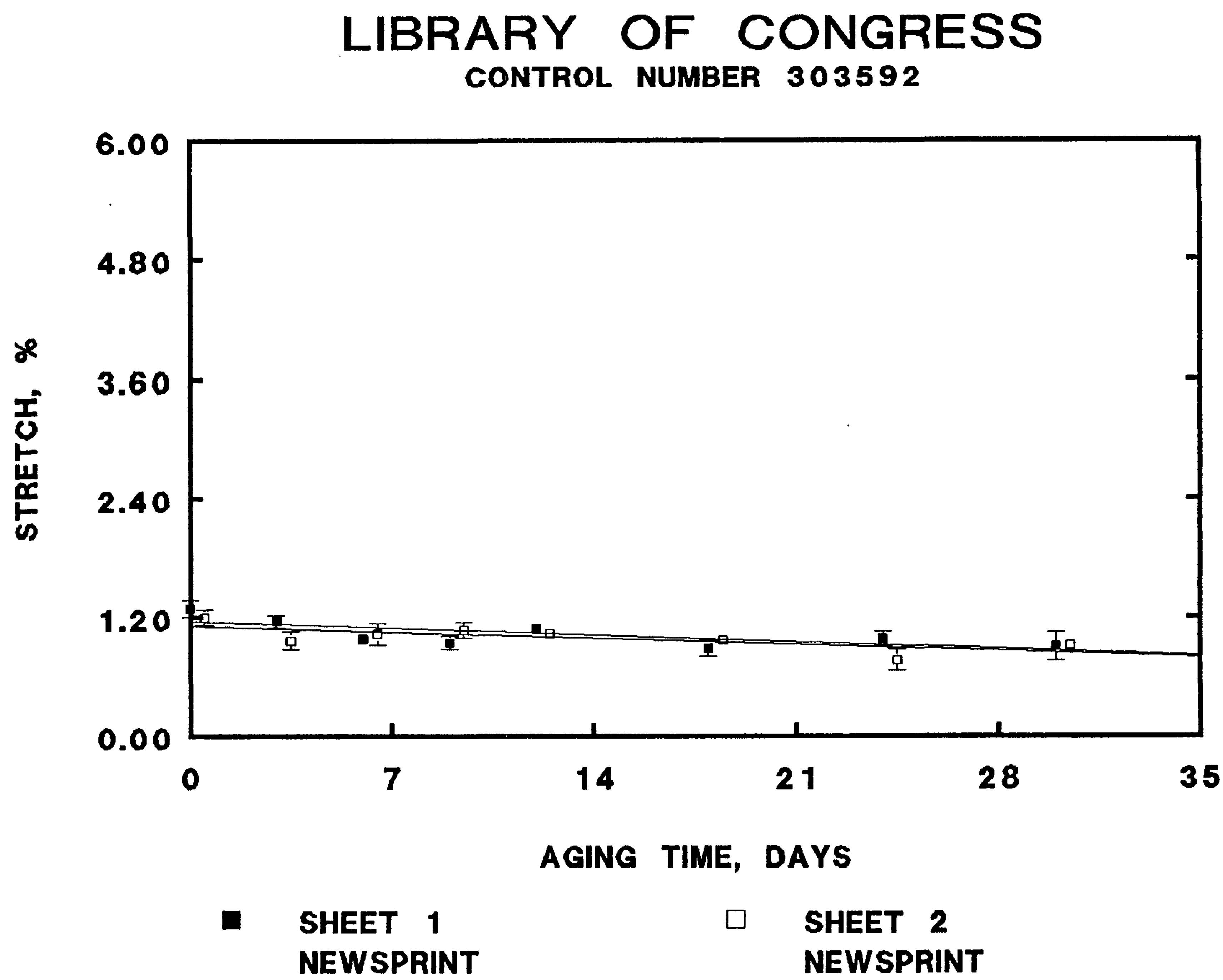
LIBRARY OF CONGRESS

CONTROL NUMBER 303592



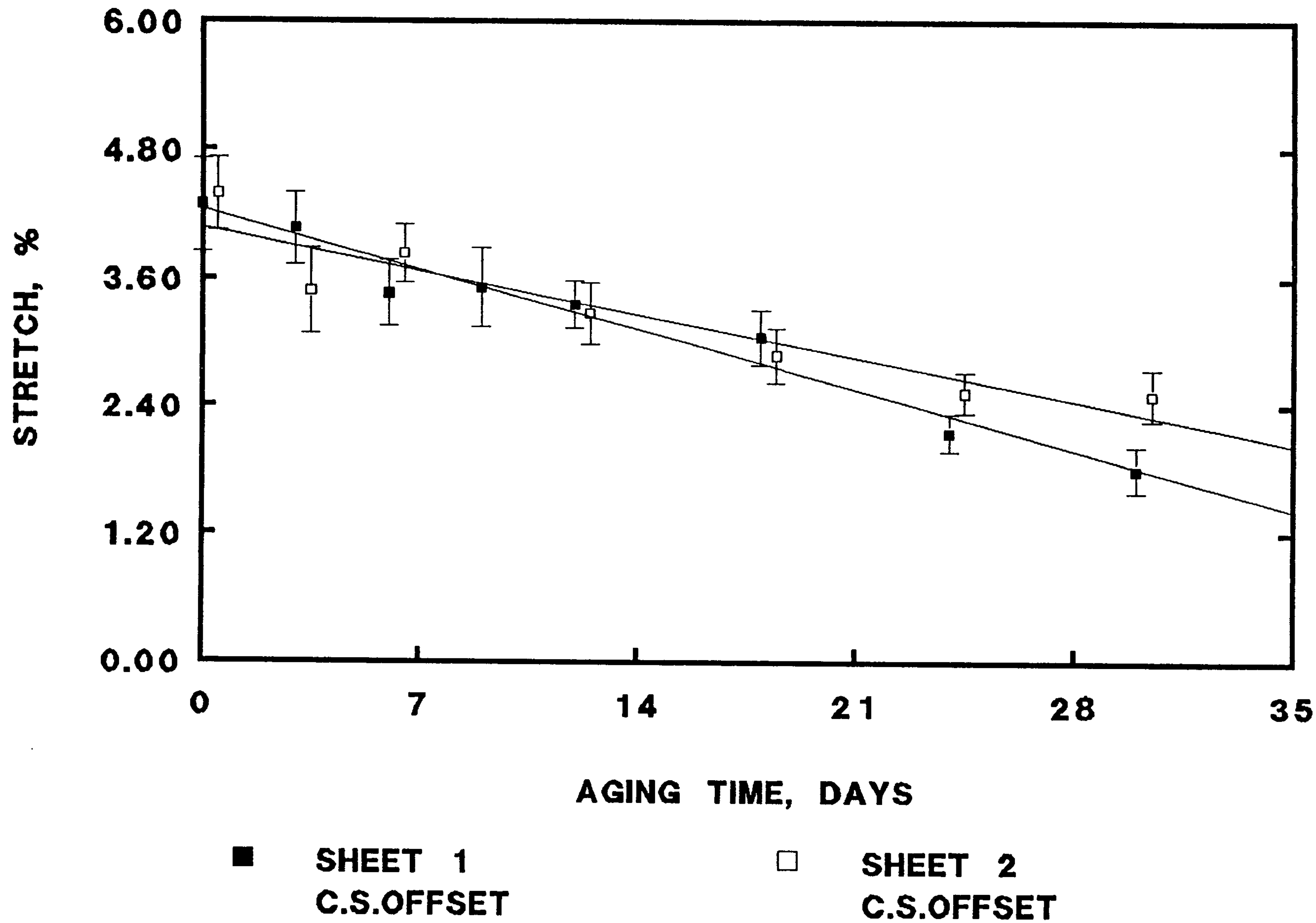
LIBRARY OF CONGRESS
CONTROL NUMBER 303592



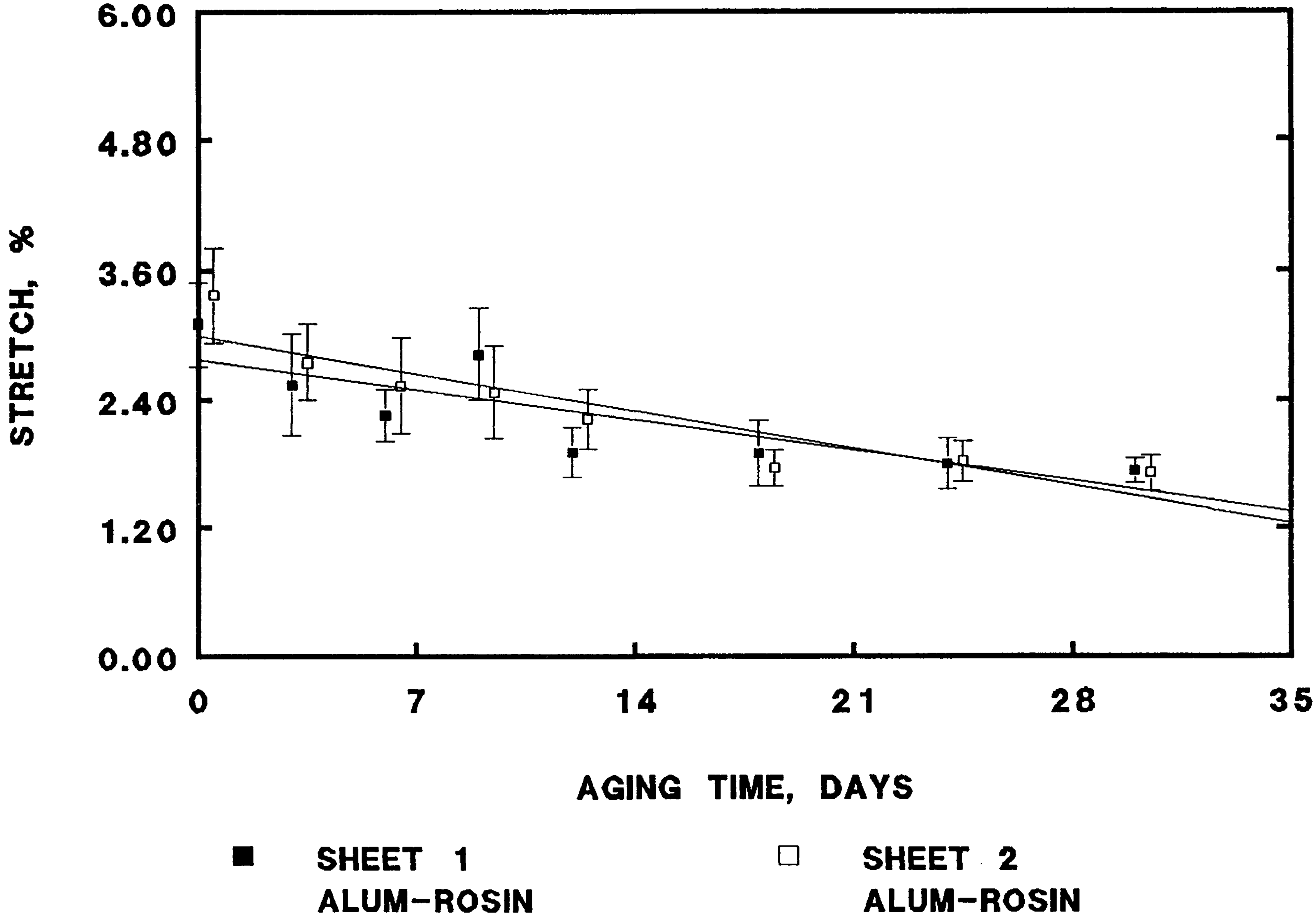

LIBRARY OF CONGRESS
CONTROL NUMBER 303592
STRETCH, %
6.00
4.80
3.60
2.40
1.20
0.00
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
NEWSPRINT
SHEET 2
NEWSPRINT

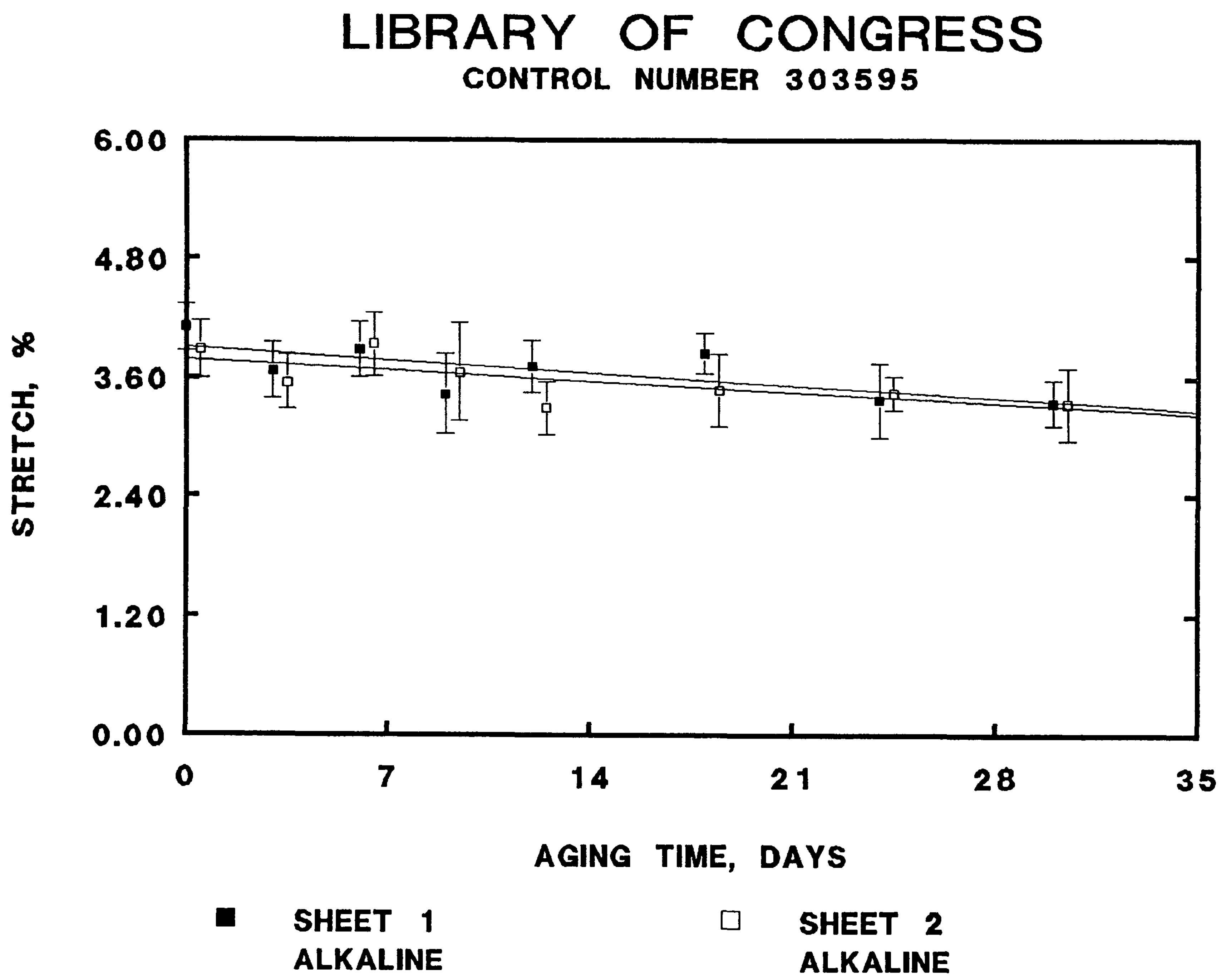
LIBRARY OF CONGRESS

CONTROL NUMBER 303595

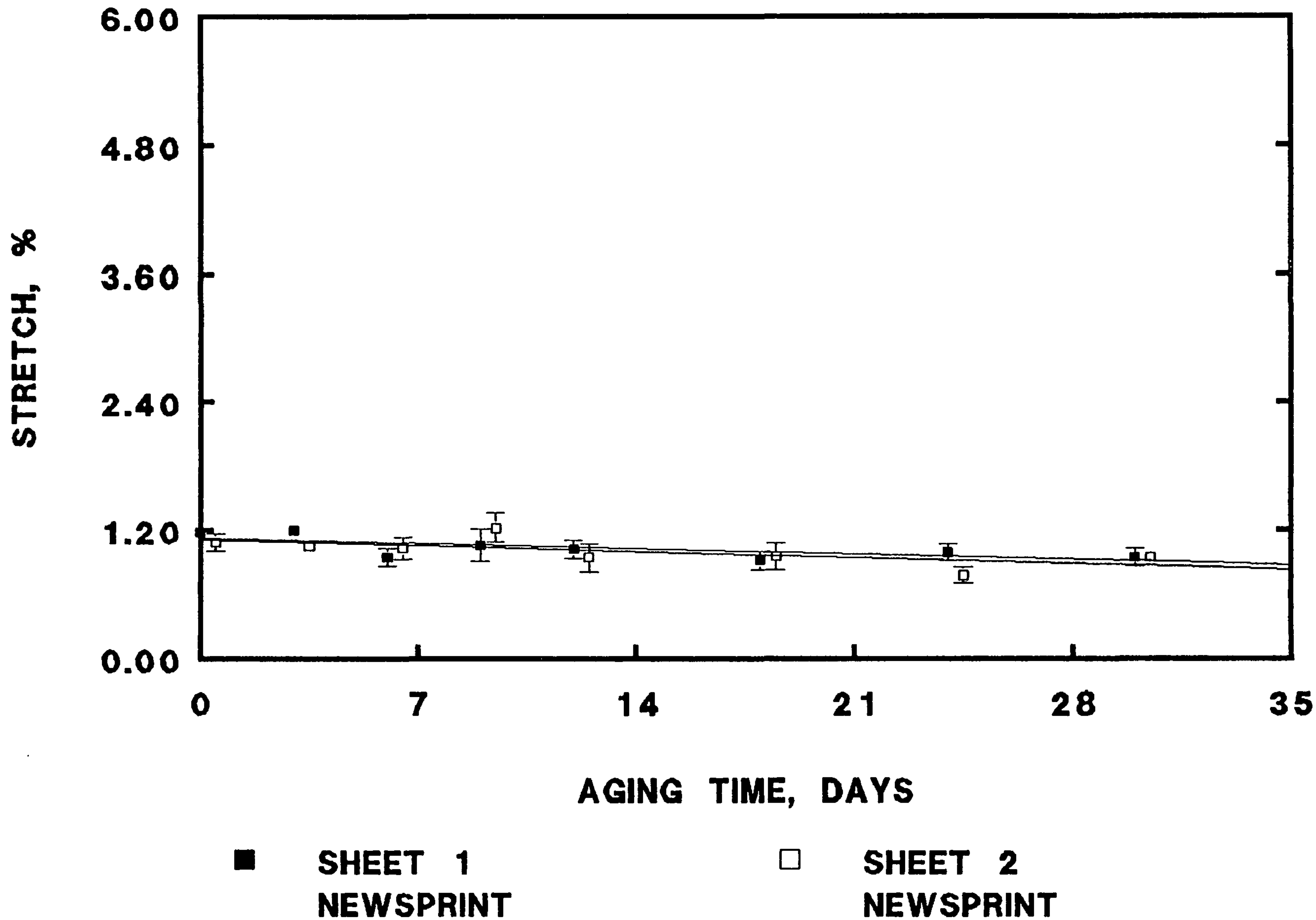


LIBRARY OF CONGRESS
CONTROL NUMBER 303595

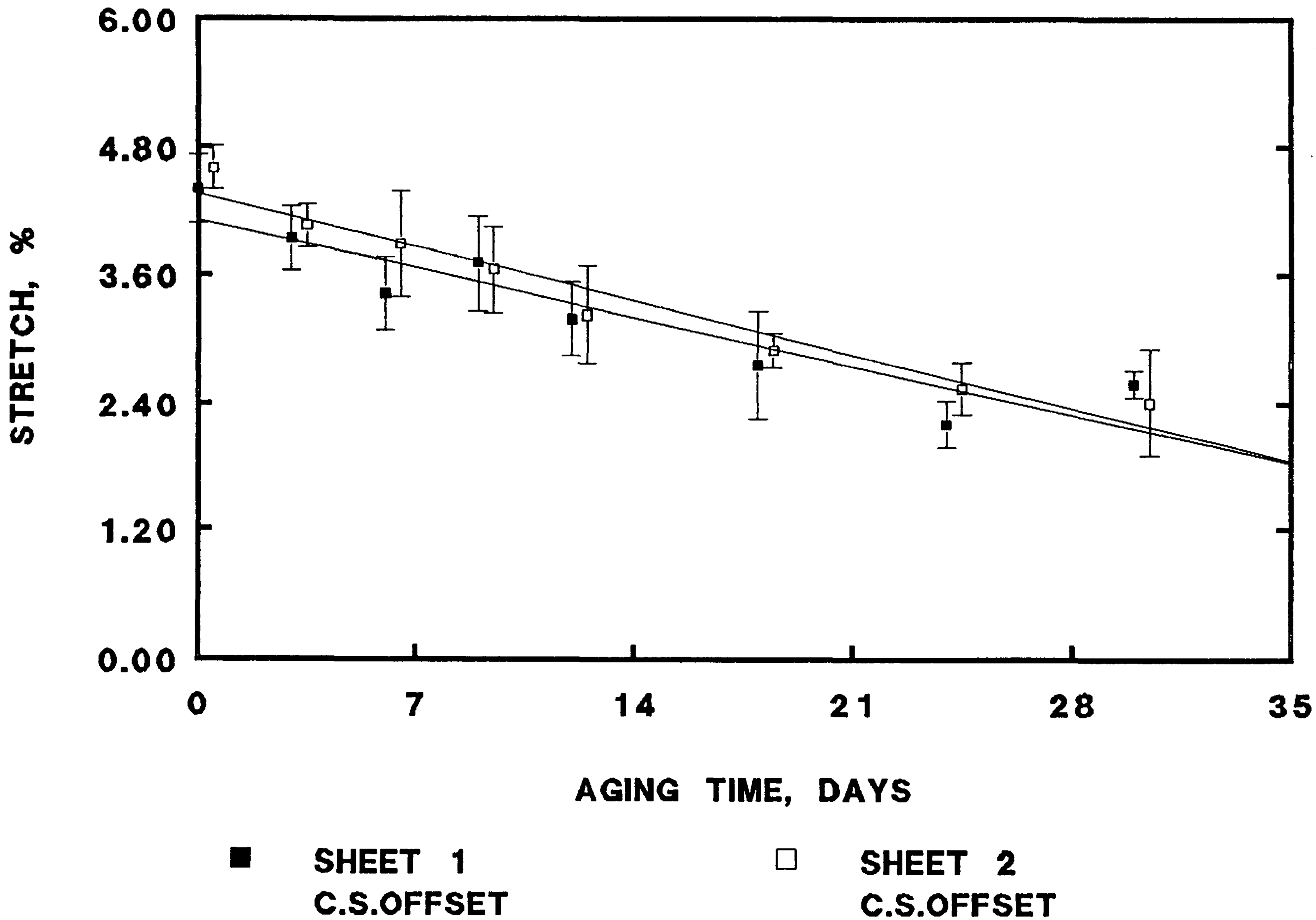



LIBRARY OF CONGRESS
CONTROL NUMBER 303595
STRETCH, %
6.00
4.80
3.60
2.40
1.20
0.00
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

LIBRARY OF CONGRESS
CONTROL NUMBER 303595

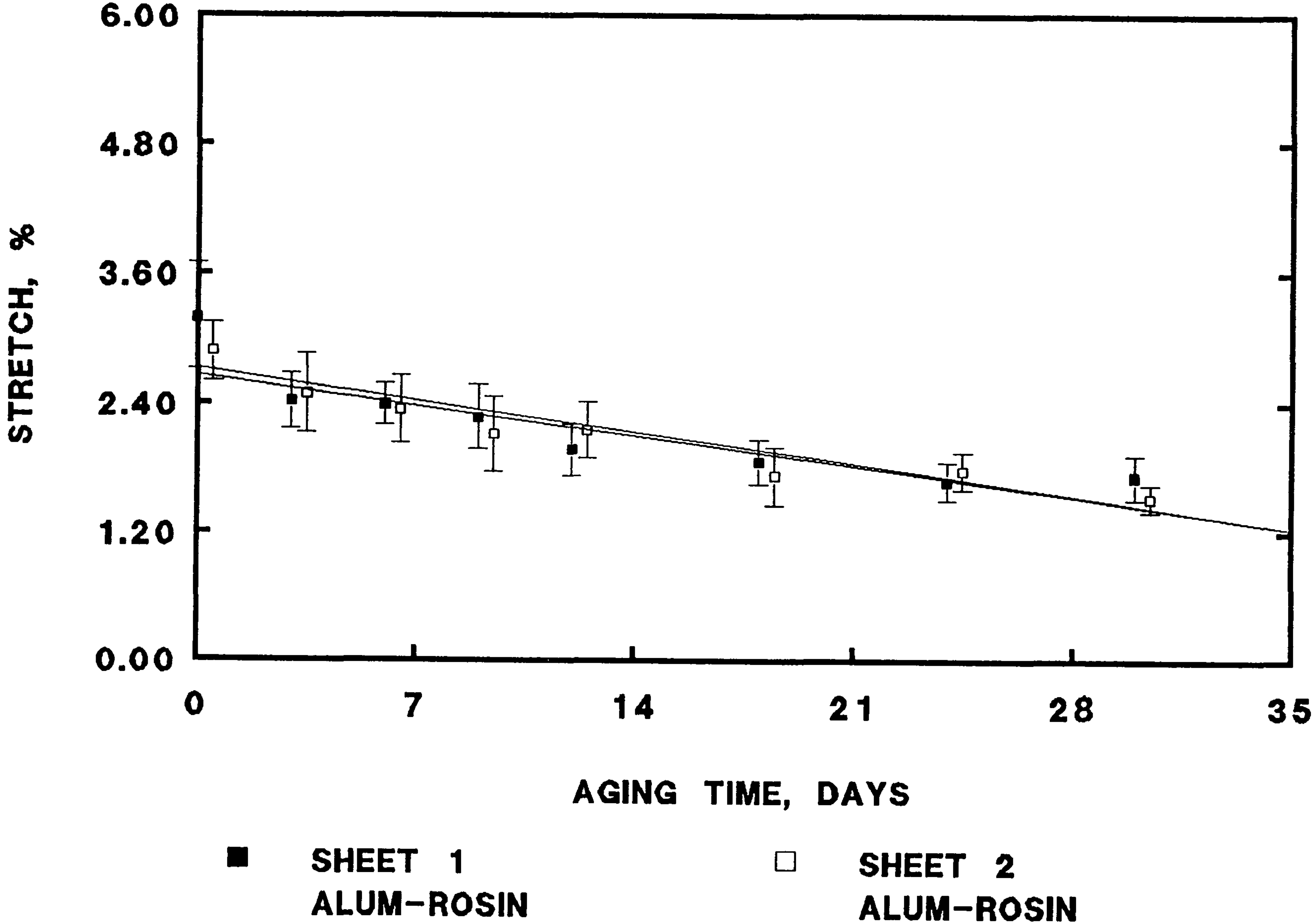


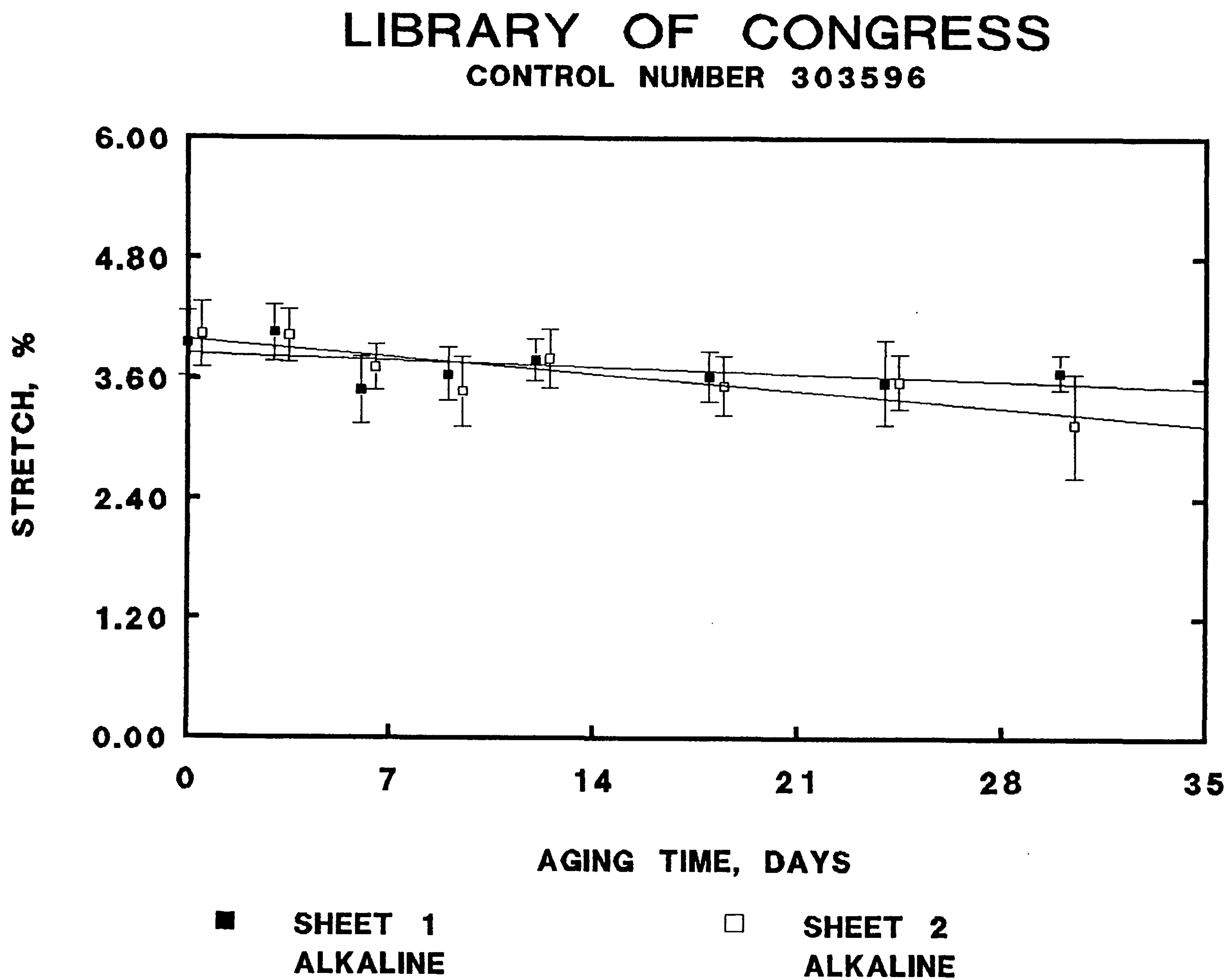
LIBRARY OF CONGRESS
CONTROL NUMBER 303596

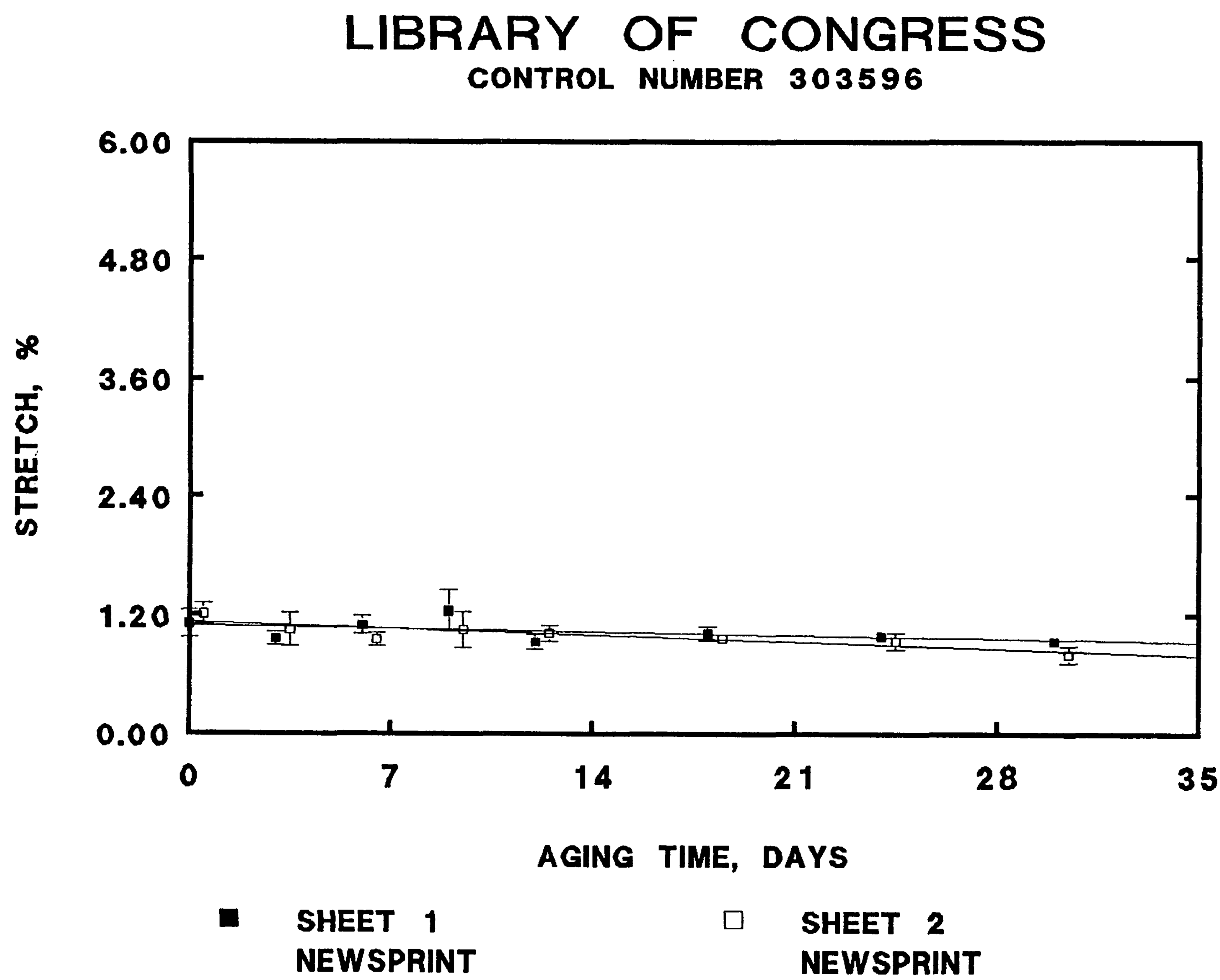


LIBRARY OF CONGRESS

CONTROL NUMBER 303596

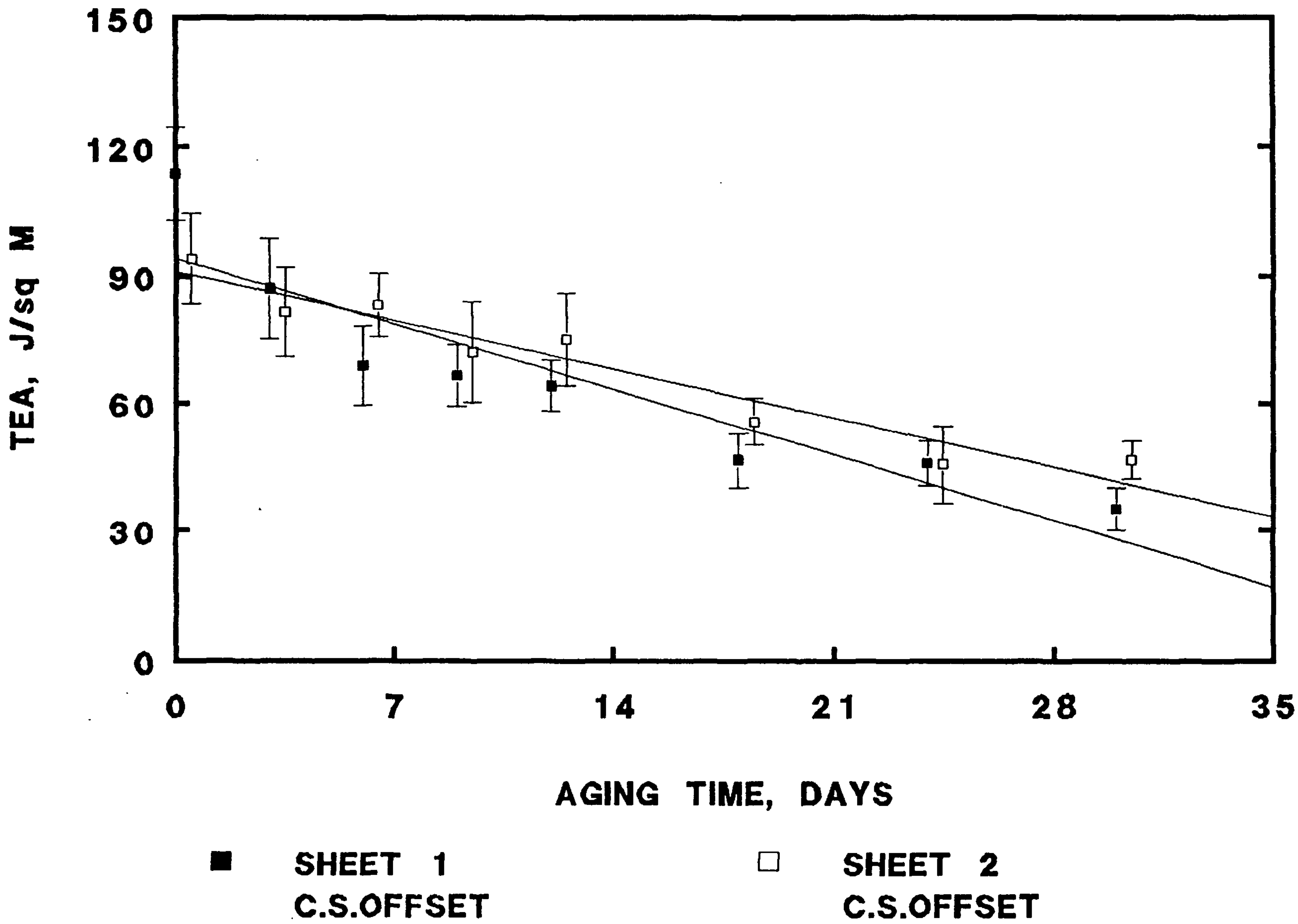



LIBRARY OF CONGRESS
CONTROL NUMBER 303596
STRETCH, %
6.00
4.80
3.60
2.40
1.20
0.00
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1 ALKALINE
SHEET 2 ALKALINE


LIBRARY OF CONGRESS
CONTROL NUMBER 303596
STRETCH, %
6.00
4.80
3.60
2.40
1.20
0.00
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
NEWSPRINT
SHEET 2
NEWSPRINT

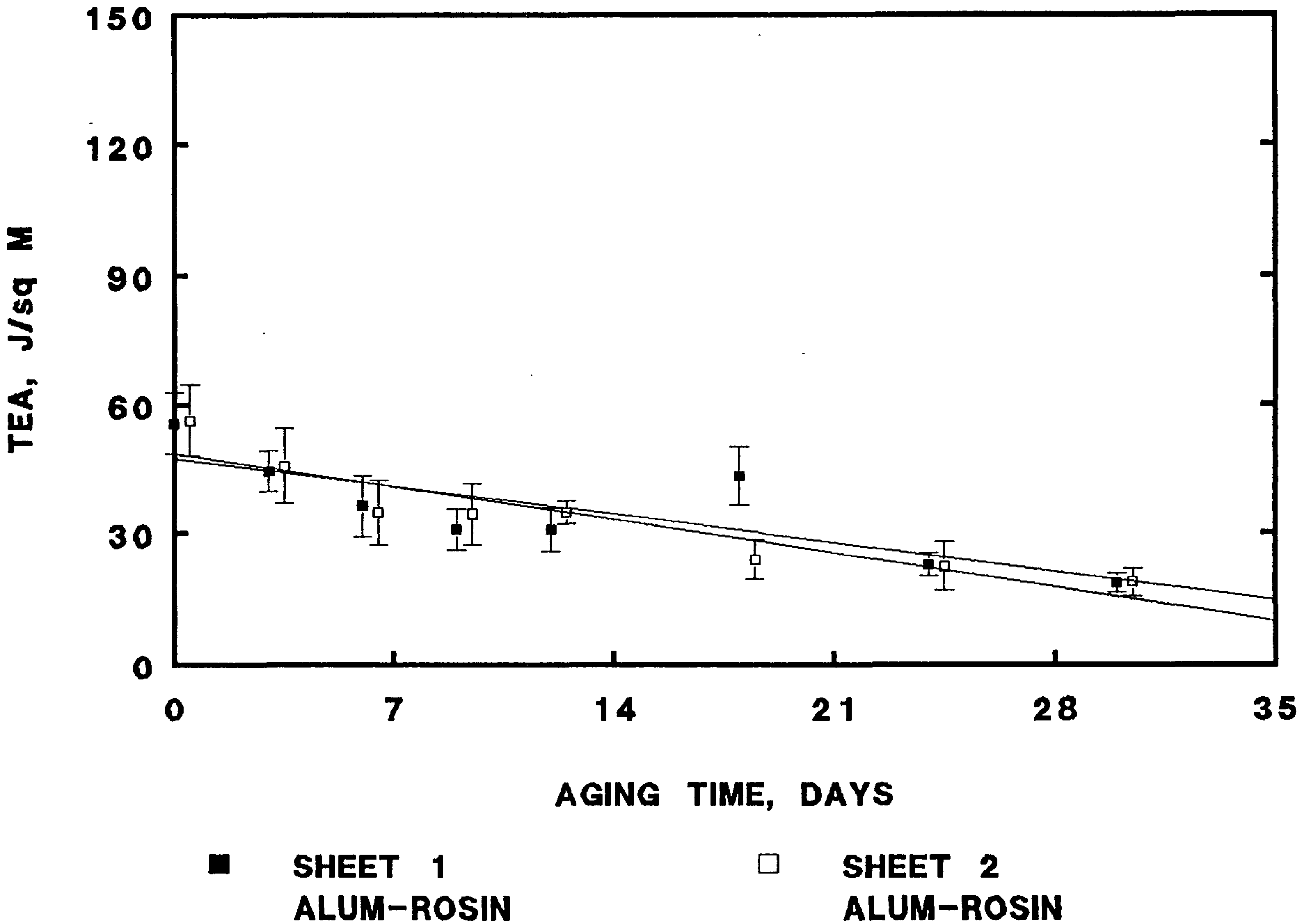
LIBRARY OF CONGRESS

CONTROL NUMBER 303592



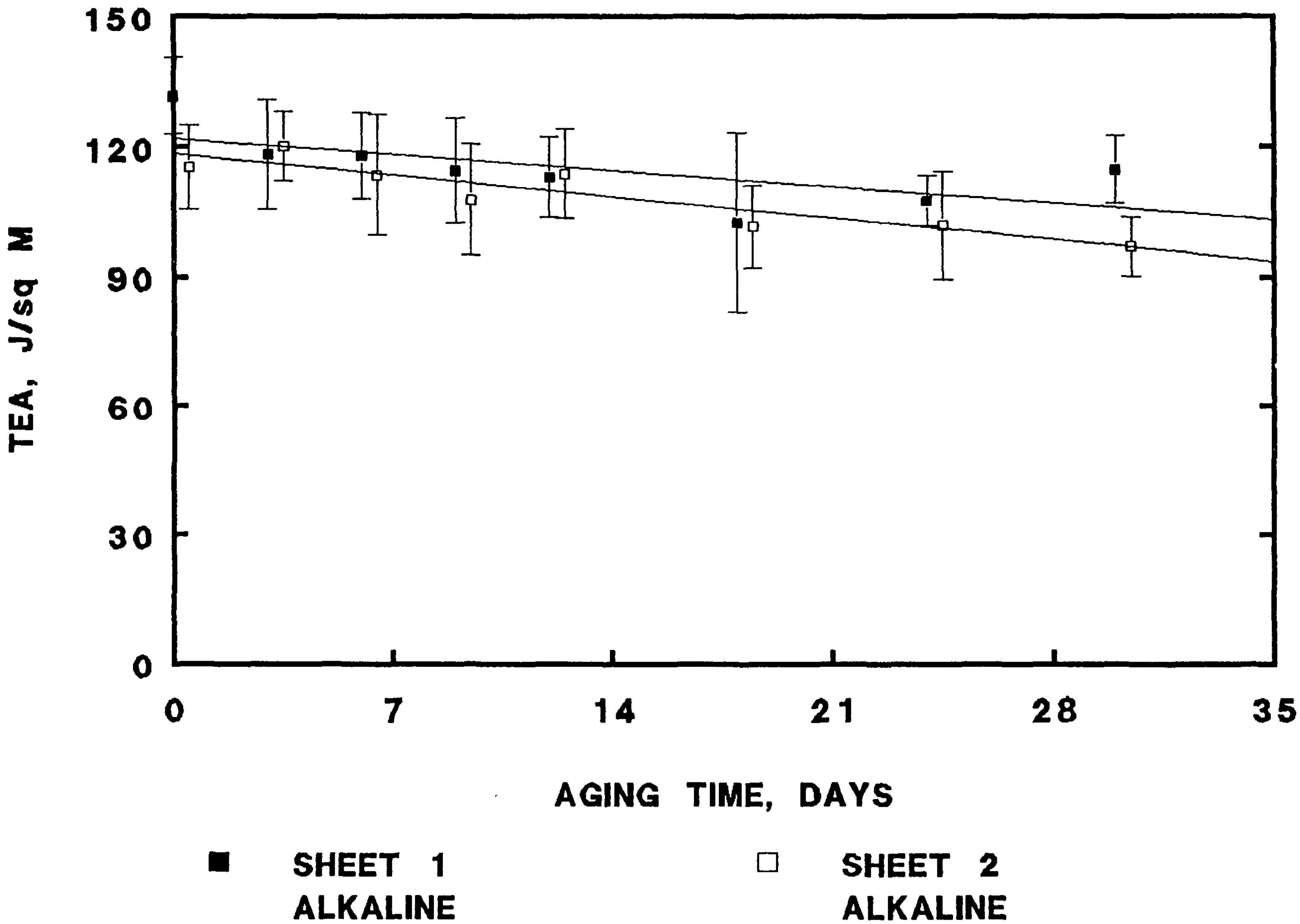
LIBRARY OF CONGRESS

CONTROL NUMBER 303592



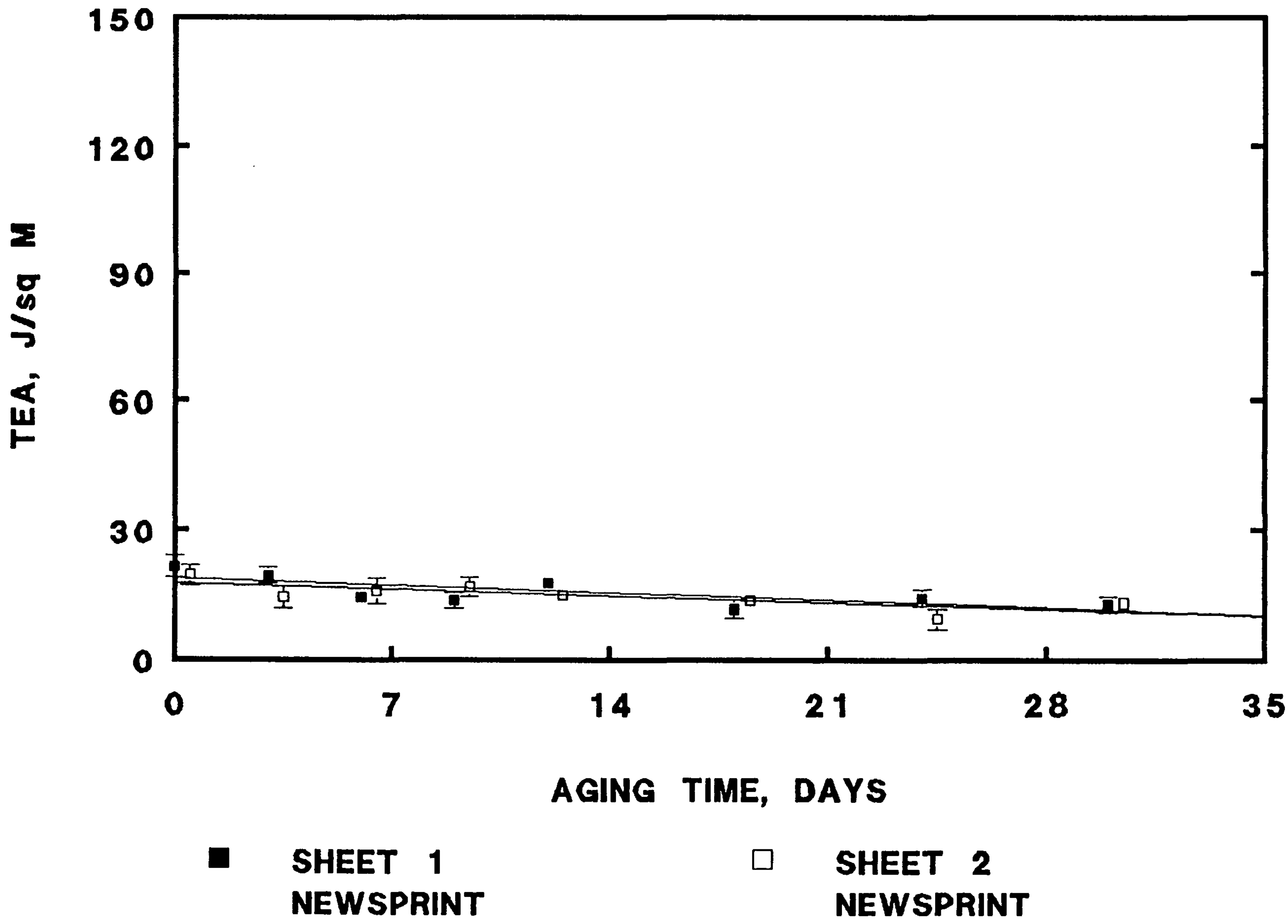
LIBRARY OF CONGRESS

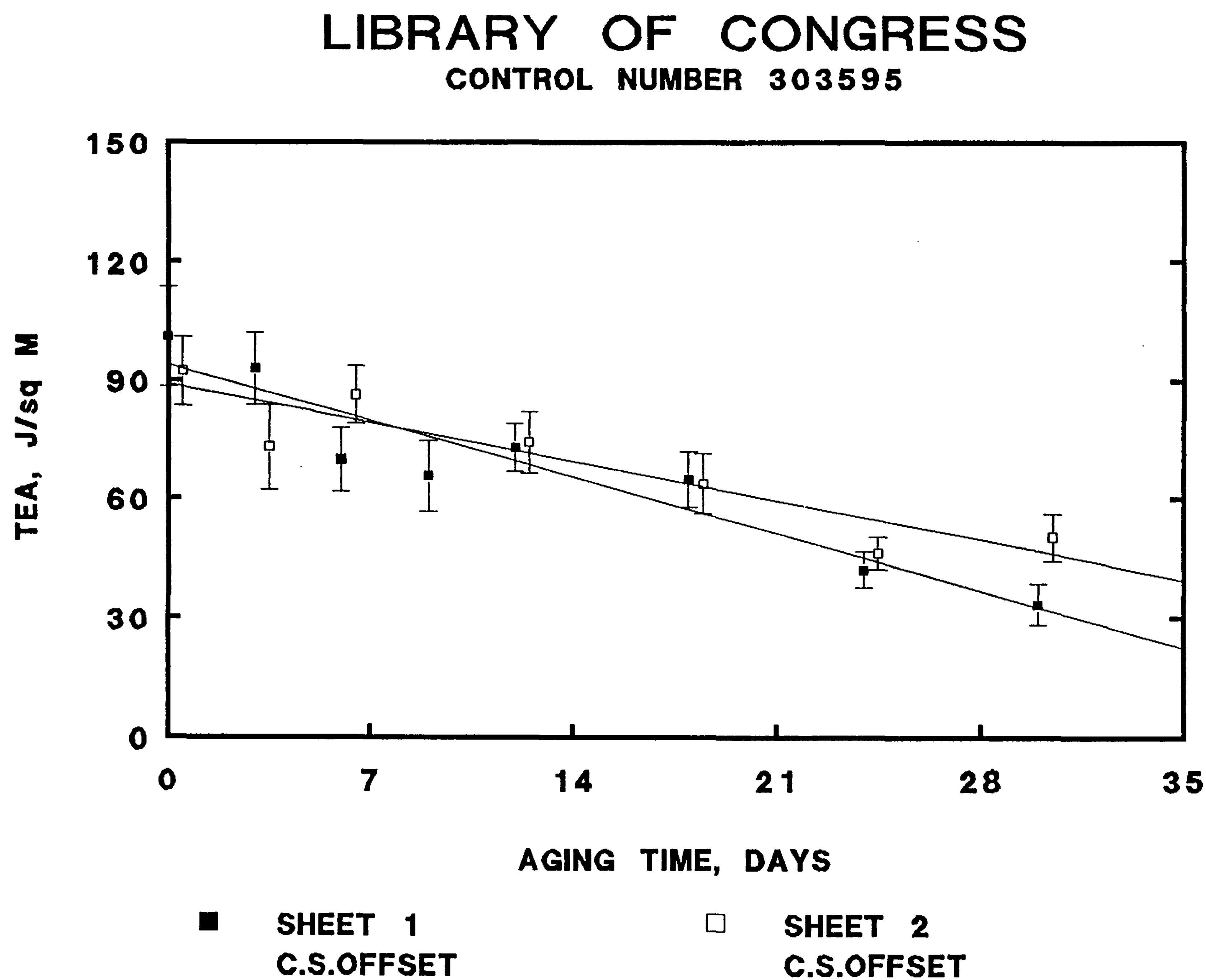
CONTROL NUMBER 303592



LIBRARY OF CONGRESS

CONTROL NUMBER 303592

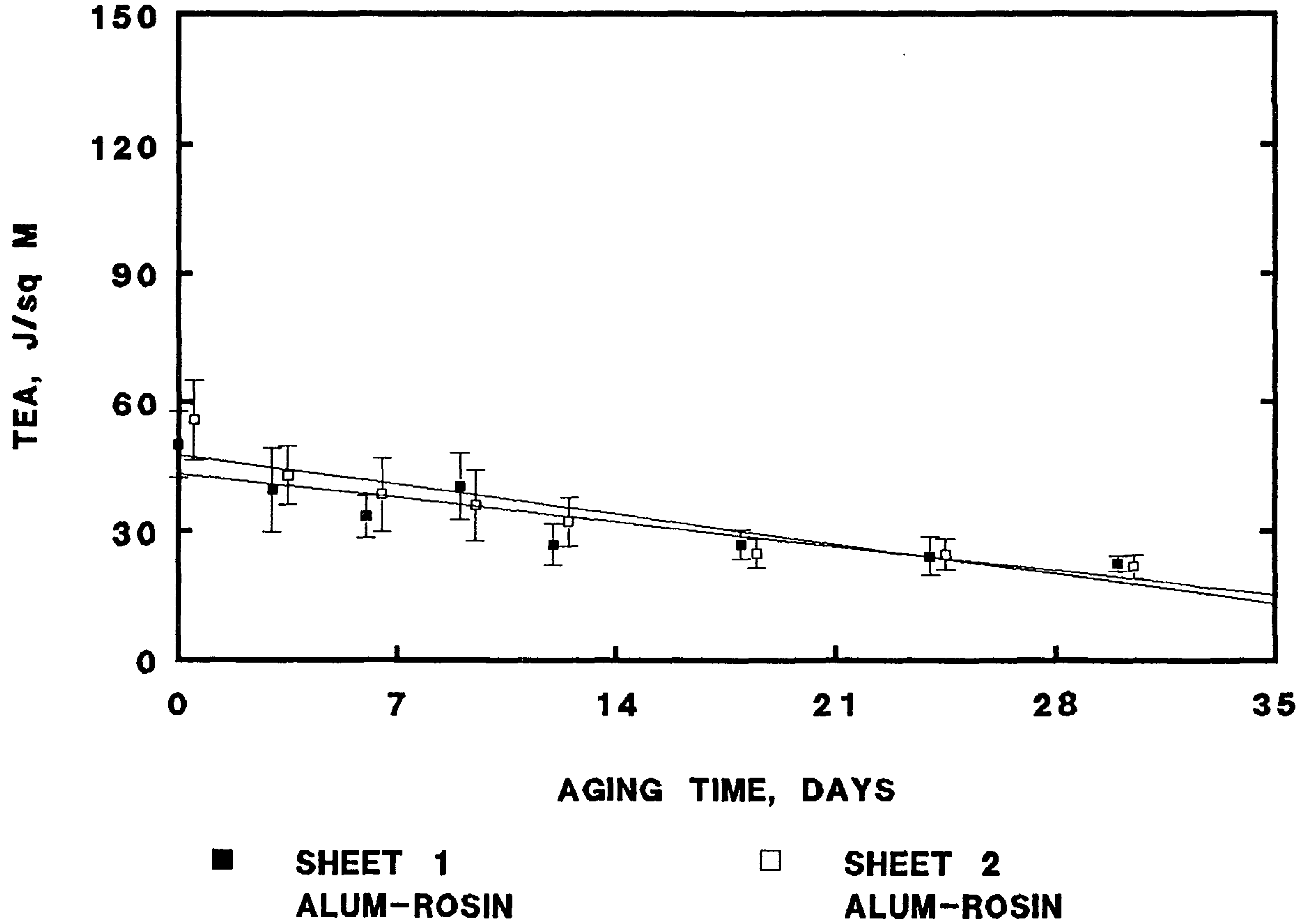




LIBRARY OF CONGRESS
CONTROL NUMBER 303595
TEA, J/sq M
150
120
90
60
30
0
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET

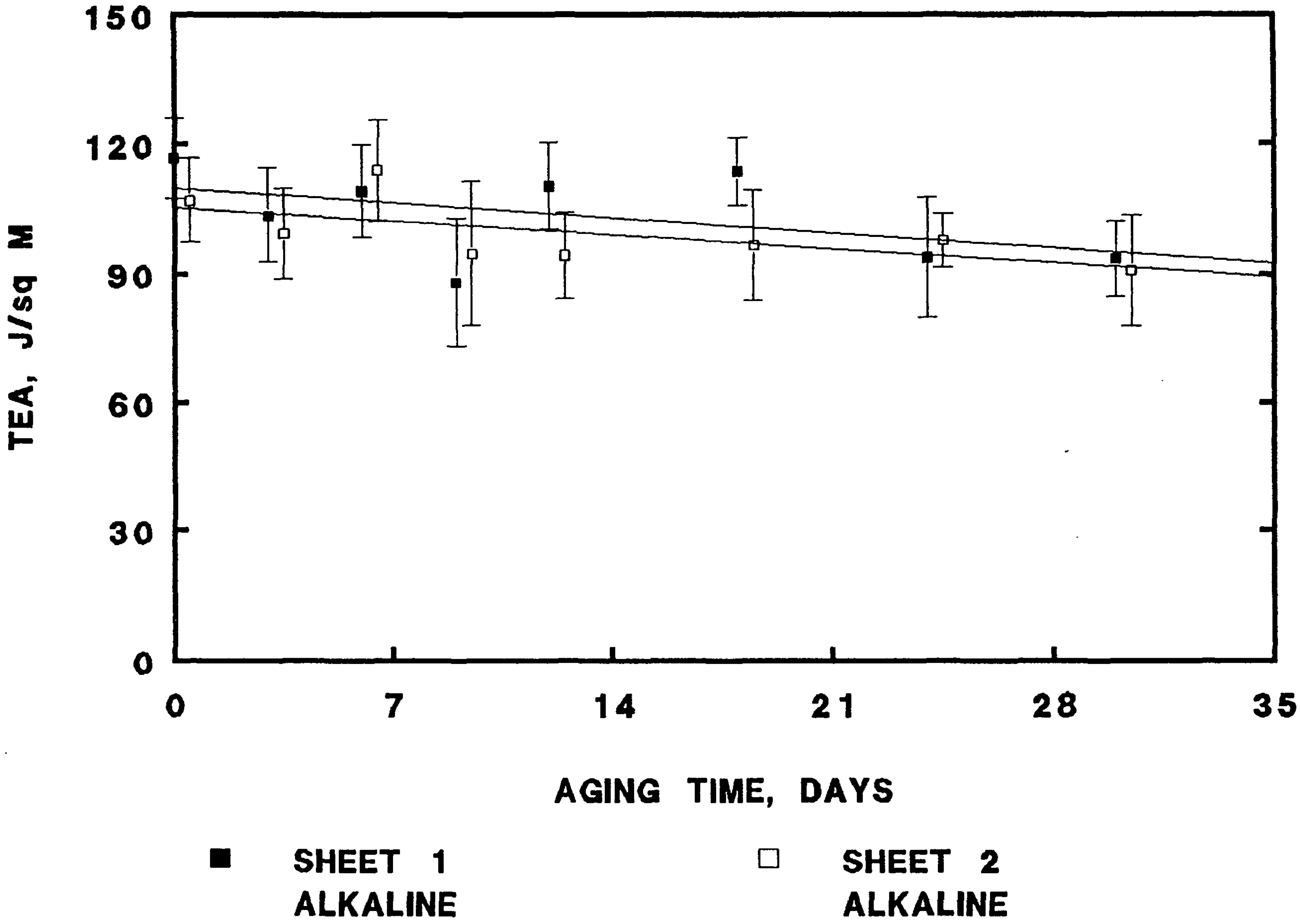
LIBRARY OF CONGRESS

CONTROL NUMBER 303595

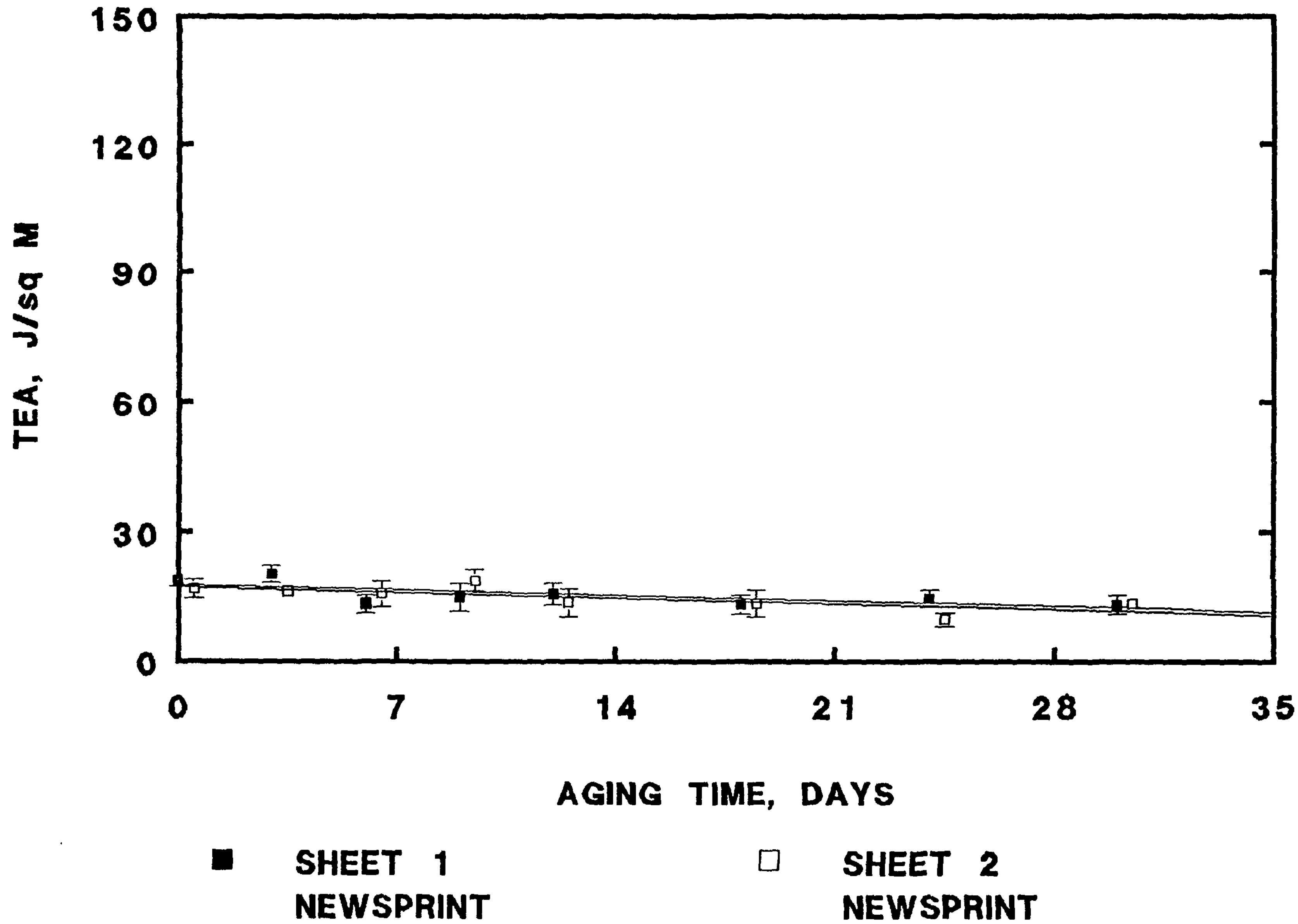


LIBRARY OF CONGRESS

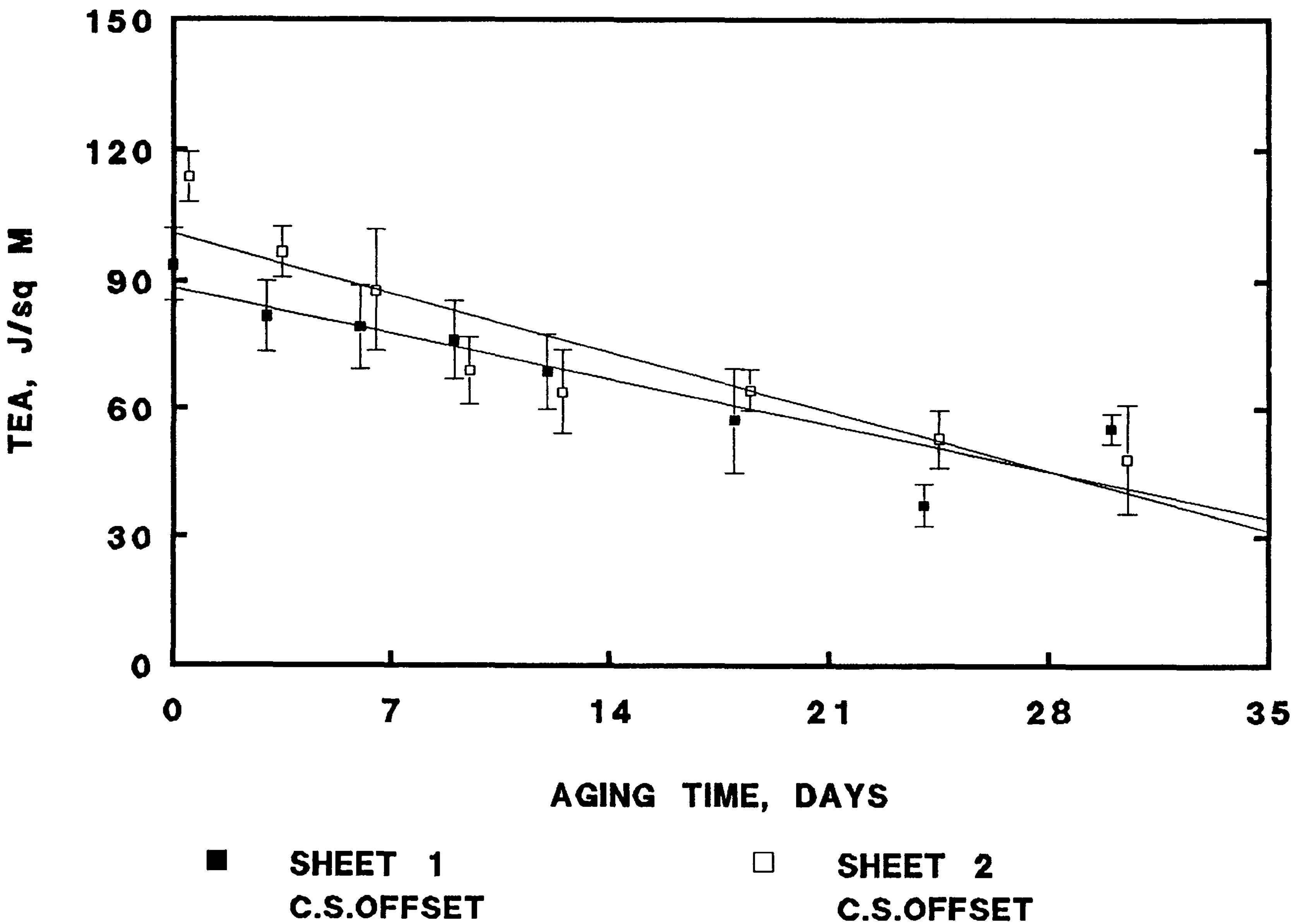
CONTROL NUMBER 303595



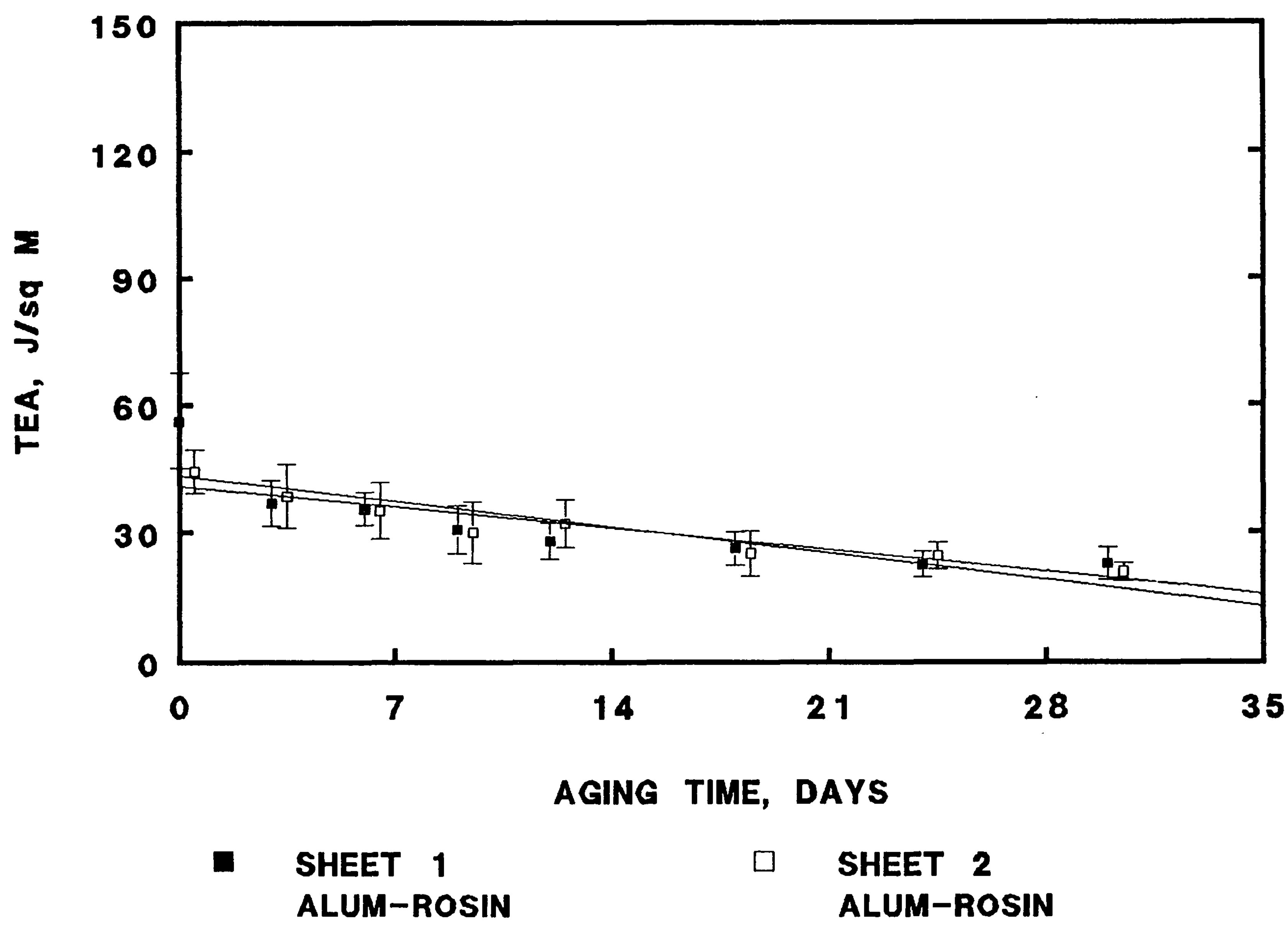
LIBRARY OF CONGRESS
CONTROL NUMBER 303595

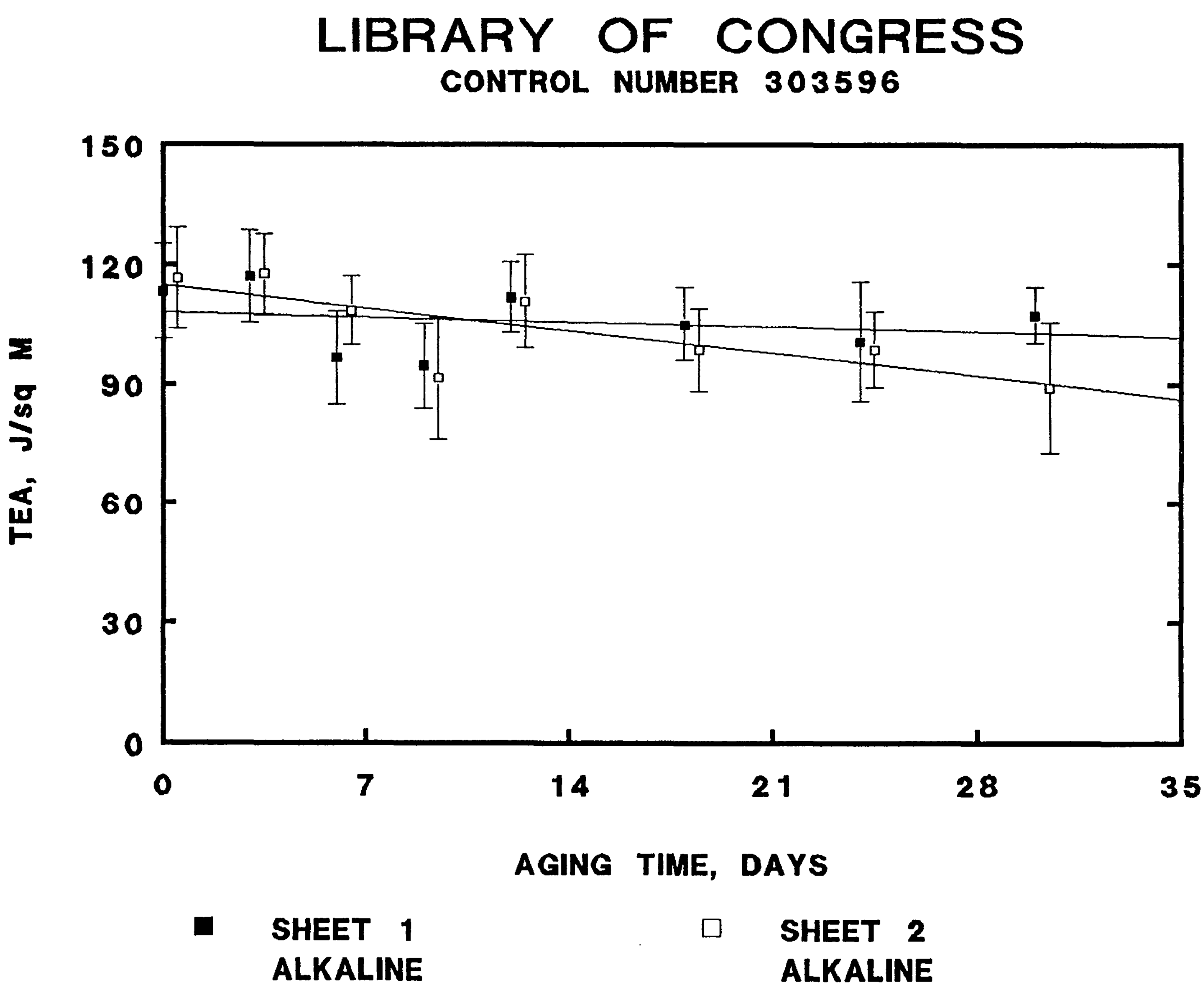


LIBRARY OF CONGRESS
CONTROL NUMBER 303596

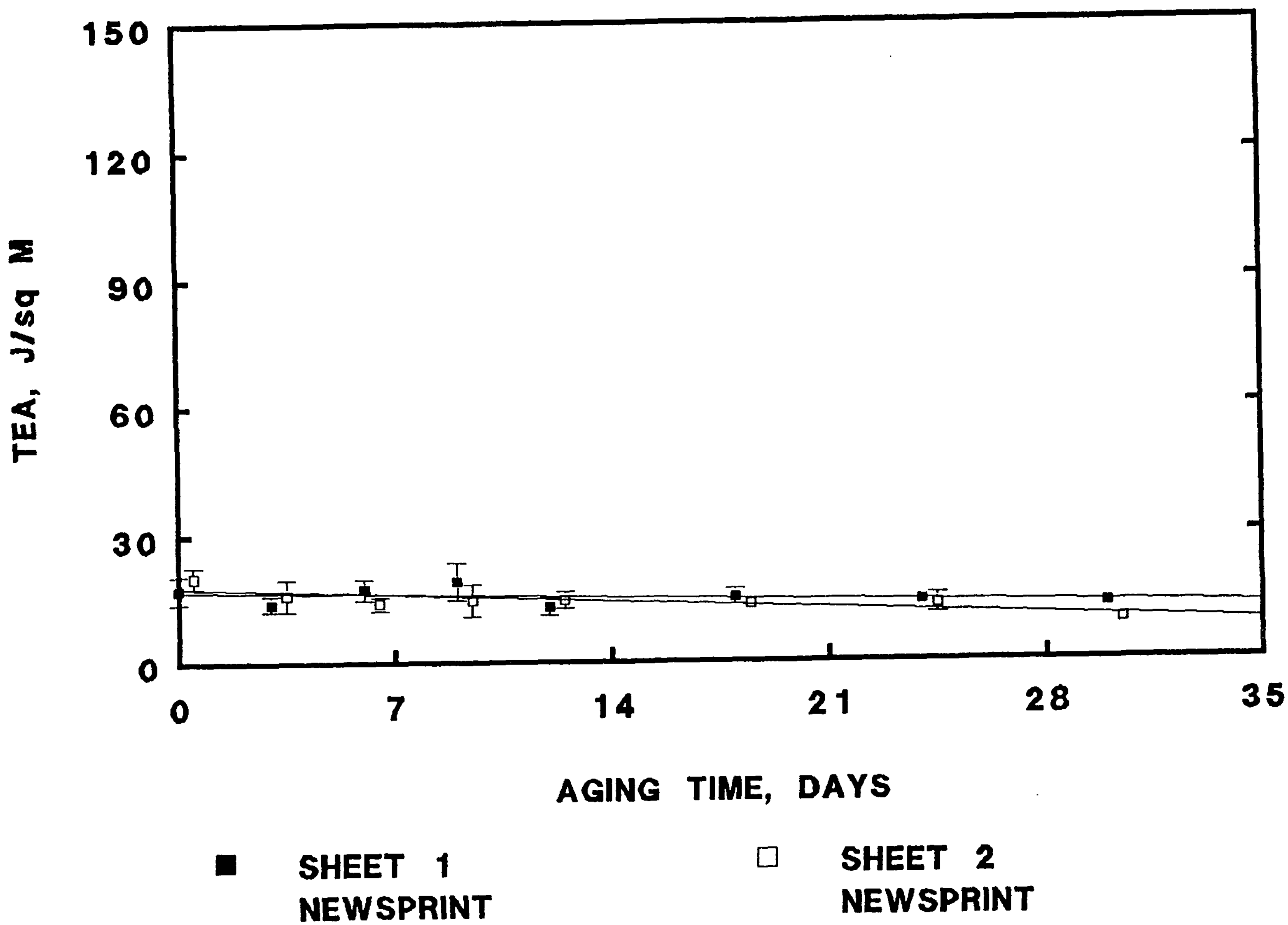


LIBRARY OF CONGRESS
CONTROL NUMBER 303596




LIBRARY OF CONGRESS
CONTROL NUMBER 303596
150
120
90
60
30
0
TEA, J/sq M
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

LIBRARY OF CONGRESS
CONTROL NUMBER 303596



LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 0 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	79.5	79.6	1	81.0	81.9
2	79.5	79.6	2	80.8	81.9
3	79.2	79.5	3	81.0	81.8
4	79.5	79.6	4	80.8	82.1
5	79.5	79.6	5	81.0	82.0
6	79.6	79.5	6	80.7	82.0
7	79.5	79.5	7	81.1	82.0
8	79.5	79.5	8	80.9	82.1
9	79.5	79.6	9	80.9	82.1
Average	79.5	79.6	Average	80.9	82.0
Std. Dev.	0.109	0.053	Std. Dev	0.127	0.105

Brightness without Fluorence, %

Tab Number			Tab Number		
9	79.4	79.3	9	77.2	78.1

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 0 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	6
Tab Number			Tab Number		
1	86.0	85.9	1	47.4	46.3
2	86.1	85.9	2	47.7	46.3
3	86.0	85.9	3	47.0	46.0
4	86.0	85.9	4	47.6	45.5
5	86.1	85.9	5	47.3	45.9
6	86.2	85.9	6	47.9	45.9
7	86.0	86.0	7	47.4	45.9
8	85.9	86.0	8	47.6	45.5
9	85.9	85.9	9	47.5	45.7
Average	86.0	85.9	Average	47.5	45.9
Std. Dev.	0.097	0.044	Std. Dev	0.257	0.293

Brightness without Fluorence, %

Tab Number			Tab Number		
9	85.7	85.6	9	47.5	45.4

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 0 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	79.5	79.4	1	81.5	80.8
2	79.4	79.4	2	81.8	80.5
3	79.5	79.5	3	81.7	80.4
4	79.4	79.2	4	81.4	80.4
5	79.5	79.5	5	81.5	80.3
6	79.4	79.5	6	81.5	80.5
7	79.3	79.4	7	81.3	80.9
8	79.1	79.5	8	81.7	80.3
9	79.4	79.3	9	81.4	80.5
Average	79.4	79.4	Average	81.5	80.5
Std. Dev.	0.127	0.105	Std. Dev	0.166	0.209

Brightness without Fluorence, %

Tab Number			Tab Number		
9	79.2	79.2	9	77.8	77.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 0 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	86.1	86.1	1	46.9	48.1
2	86.1	86.0	2	47.6	48.2
3	85.9	85.9	3	47.7	48.2
4	86.1	86.1	4	47.2	48.4
5	86.1	86.1	5	47.8	48.5
6	86.0	86.1	6	47.3	48.3
7	86.1	86.1	7	47.3	48.4
8	86.1	86.0	8	47.3	48.7
9	85.9	86.0	9	47.2	48.3
Average	86.0	86.0	Average	47.4	48.3
Std. Dev.	0.088	0.073	Std. Dev	0.283	0.181

Brightness without Fluorence, %

Tab Number			Tab Number		
9	85.7	85.7	9	46.9	48.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 0 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	79.6	79.6	1	81.3	80.9
2	79.6	79.6	2	81.4	80.9
3	79.5	79.5	3	81.5	81.0
4	79.6	79.6	4	81.3	80.9
5	79.7	79.7	5	81.5	81.1
6	79.5	79.5	6	81.5	81.1
7	79.7	79.7	7	81.5	80.8
8	79.2	79.2	8	81.5	81.0
9	79.7	79.7	9	81.5	81.2
Average	79.6	79.6	Average	81.4	81.0
Std. Dev.	0.158	0.158	Std. Dev	0.088	0.127

Brightness without Fluorence, %

Tab Number			Tab Number		
9	79.3	79.4	9	77.8	77.4

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 0 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	86.0	86.0	1	46.6	47.4
2	86.1	86.1	2	46.9	47.5
3	86.0	85.9	3	46.8	47.3
4	86.1	85.9	4	46.2	47.3
5	85.9	86.0	5	46.4	47.4
6	85.3	85.9	6	46.2	47.8
7	85.9	86.2	7	46.2	47.4
8	86.1	86.1	8	46.6	47.8
9	85.9	86.0	9	46.0	47.4
Average	85.9	86.0	Average	46.4	47.5
Std. Dev.	0.249	0.105	Std. Dev	0.308	0.192

Brightness without Fluorence, %

Tab Number			Tab Number		
9	85.8	85.6	9	45.6	47.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 3 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	74.6	75.1	1	74.7	74.2
2	74.4	75.0	2	74.8	74.2
3	74.6	75.0	3	75.2	74.6
4	74.7	75.2	4	74.8	74.7
5	74.7	75.4	5	74.8	74.7
6	74.6	75.5	6	75.0	74.8
7	74.8	75.6	7	75.0	74.9
8	74.7	75.4	8	75.0	74.9
9	75.2	75.6	9	75.1	74.9
Average	74.7	75.3	Average	74.9	74.7
Std. Dev.	0.218	0.242	Std. Dev	0.166	0.279

Brightness without
Fluorence, %

Tab Number			Tab Number		
9	75.0	75.3	9	72.1	74.9

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 3 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	82.4	81.9	1	41.3	39.5
2	82.3	81.8	2	41.2	39.6
3	82.5	81.8	3	41.2	39.5
4	82.7	82.3	4	41.1	39.2
5	82.6	82.1	5	41.1	39.2
6	82.6	82.1	6	40.9	39.1
7	82.7	82.5	7	40.7	38.8
8	82.8	82.3	8	41.5	38.9
9	82.8	82.2	9	41.0	38.8
Average	82.6	82.1	Average	41.1	39.2
Std. Dev.	0.173	0.242	Std. Dev	0.232	0.307

Brightness without Fluorence, %

Tab Number			Tab Number		
9	82.4	81.8	9	40.9	38.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 3 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	75.3	75.3	1	75.0	73.7
2	75.3	75.4	2	75.3	73.9
3	75.2	75.3	3	75.0	74.1
4	75.3	75.5	4	75.0	73.5
5	75.2	75.5	5	75.0	73.8
6	75.4	75.5	6	75.1	73.9
7	75.4	75.4	7	75.0	73.6
8	75.5	75.7	8	74.9	74.1
9	75.5	75.6	9	75.2	74.1
Average	75.3	75.5	Average	75.1	73.9
Std. Dev.	0.113	0.132	Std. Dev	0.124	0.224

Brightness without Fluorence, %

Tab Number			Tab Number		
9	75.4	75.4	9	72.3	71.6

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 3 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	83.0	83.0	1	42.0	41.8
2	82.9	83.0	2	42.1	41.9
3	82.9	82.7	3	42.3	41.7
4	82.8	82.9	4	42.2	42.0
5	82.9	82.9	5	41.9	41.8
6	82.8	82.7	6	42.2	42.0
7	82.9	82.9	7	42.1	42.0
8	83.0	83.0	8	41.8	42.0
9	83.0	83.1	9	42.1	41.7
Average	82.9	82.9	Average	42.1	41.9
Std. Dev.	0.078	0.136	Std. Dev	0.156	0.130

Brightness without Fluorence, %

Tab Number			Tab Number		
9	82.7	82.8	9	41.9	41.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 3 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	74.4	75.2	1	73.2	74.3
2	74.7	75.3	2	73.4	74.6
3	74.6	75.2	3	73.6	74.8
4	74.3	75.2	4	73.3	74.5
5	74.7	75.5	5	73.4	74.7
6	74.6	75.6	6	73.8	74.9
7	74.5	75.3	7	73.5	74.8
8	74.7	75.5	8	73.0	74.7
9	74.8	75.6	9	74.0	75.3
Average	74.6	75.4	Average	73.5	74.7
Std. Dev.	0.162	0.172	Std. Dev	0.304	0.278

Brightness without Fluorence, %

Tab Number			Tab Number		
9	74.7	75.5	9	71.2	72.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 3 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	3	7		3	7
Tab Number			Tab Number		
1	82.1	81.8	1	41.3	40.3
2	82.2	81.8	2	41.1	40.2
3	82.4	81.7	3	41.2	40.5
4	82.3	81.6	4	41.0	39.8
5	82.3	81.8	5	41.2	40.2
6	82.4	81.7	6	41.2	40.3
7	82.3	81.9	7	41.2	39.9
8	82.4	81.9	8	40.9	40.1
9	82.8	82.2	9	41.1	40.2
Average	82.4	81.8	Average	41.1	40.2
Std. Dev.	0.194	0.172	Std. Dev	0.122	0.212

Brightness without Fluorence, %

Tab Number			Tab Number		
9	82.3	81.9	9	41.0	40.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 6 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	70.8	72.1	1	71.1	71.1
2	71.1	72.2	2	71.3	70.9
3	70.9	72.0	3	71.2	71.4
4	71.3	72.3	4	71.3	71.1
5	71.3	72.2	5	71.4	71.1
6	71.7	72.5	6	71.8	71.5
7	71.2	72.4	7	71.5	71.0
8	71.5	72.4	8	71.4	71.2
9	71.7	72.8	9	72.0	71.7
Average	71.3	72.3	Average	71.4	71.2
Std. Dev.	0.319	0.239	Std. Dev	0.288	0.259

Brightness without Fluorence, %

Tab Number			Tab Number		
9	71.5	72.6	9	69.5	69.4

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 6 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	80.1	79.1	1	37.1	37.0
2	79.9	78.9	2	37.5	37.1
3	80.0	78.9	3	37.2	37.2
4	79.9	79.2	4	36.5	36.8
5	80.1	79.1	5	36.6	37.3
6	80.1	79.1	6	36.9	37.2
7	80.1	79.4	7	36.7	37.0
8	80.1	79.2	8	36.3	36.8
9	80.3	79.7	9	36.7	37.0
Average	80.1	79.2	Average	36.8	37.0
Std. Dev.	0.122	0.249	Std. Dev	0.377	0.174

Brightness without Fluorence, %

Tab Number			Tab Number		
9	80.1	79.4	9	36.6	36.9

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 6 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	71.6	72.9	1	71.0	70.4
2	71.9	72.8	2	71.5	70.0
3	71.7	73.0	3	71.1	70.2
4	71.8	72.9	4	71.1	70.5
5	72.2	73.1	5	71.6	70.3
6	72.0	72.9	6	71.6	70.0
7	72.0	73.0	7	71.2	70.6
8	72.0	73.3	8	71.8	70.7
9	72.3	73.2	9	71.9	70.8
Average	71.9	73.0	Average	71.4	70.4
Std. Dev.	0.224	0.162	Std. Dev	0.331	0.289

Brightness without Fluorence, %

Tab Number			Tab Number		
9	72.1	73.1	9	69.7	68.4

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 6 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	80.9	80.9	1	39.3	38.4
2	80.9	80.5	2	39.3	38.2
3	80.7	80.2	3	38.9	38.4
4	81.2	80.9	4	38.3	37.4
5	81.1	80.7	5	38.9	38.1
6	80.9	80.7	6	39.0	38.1
7	81.4	81.0	7	38.9	37.9
8	81.2	80.9	8	38.9	37.5
9	81.2	80.8	9	39.0	38.0
Average	81.1	80.7	Average	38.9	38.0
Std. Dev.	0.219	0.250	Std. Dev	0.292	0.354

Brightness without Fluorence, %

Tab Number			Tab Number		
9	81.0	80.5	9	38.9	37.9

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 6 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	73.5	72.8	1	70.6	70.3
2	73.1	73.0	2	70.5	70.3
3	72.9	73.0	3	70.7	70.3
4	73.4	73.0	4	70.6	70.4
5	72.9	73.4	5	70.6	70.7
6	73.0	73.3	6	70.9	70.8
7	73.7	73.2	7	71.0	70.8
8	73.3	73.1	8	71.0	70.9
9	73.5	73.6	9	71.2	71.0
Average	73.3	73.2	Average	70.8	70.6
Std. Dev.	0.292	0.246	Std. Dev	0.242	0.285

Brightness without Fluorence, %

Tab Number			Tab Number		
9	73.4	73.5	9	68.8	68.6

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 6 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	10	15		10	15
Tab Number			Tab Number		
1	80.3	79.6	1	38.3	37.2
2	80.3	79.5	2	38.1	37.3
3	80.6	79.4	3	38.7	37.2
4	80.5	79.6	4	38.1	37.0
5	80.4	79.3	5	37.9	37.0
6	80.4	79.6	6	38.2	37.3
7	80.8	80.2	7	37.7	37.3
8	80.7	79.9	8	37.7	36.8
9	80.9	79.9	9	38.2	37.2
Average	80.5	79.7	Average	38.1	37.1
Std. Dev.	0.219	0.283	Std. Dev	0.312	0.174

Brightness without Fluorence, %

Tab Number			Tab Number		
9	80.6	79.6	9	38.1	37.1

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 9 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	68.9	70.0	1	68.8	67.0
2	68.5	69.8	2	68.5	66.3
3	69.2	70.1	3	69.3	67.2
4	68.5	69.9	4	69.2	66.9
5	68.2	70.4	5	68.8	66.8
6	68.7	70.2	6	69.5	67.0
7	68.4	70.2	7	69.2	67.3
8	68.3	70.3	8	69.0	69.7
9	68.2	70.7	9	69.7	69.8
Average	68.5	70.2	Average	69.1	67.6
Std. Dev.	0.336	0.273	Std. Dev	0.376	1.276

Brightness without Fluorence, %

Tab Number			Tab Number		
9	68.1	70.0	9	67.4	67.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 9 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	78.1	76.6	1	35.4	35.2
2	77.9	76.7	2	35.6	35.3
3	78.7	77.5	3	35.8	35.2
4	76.6	74.8	4	34.5	34.8
5	78.1	76.5	5	35.4	35.2
6	78.1	76.5	6	35.4	35.3
7	78.1	76.5	7	35.4	35.3
8	78.1	76.5	8	35.4	35.3
9	78.1	76.5	9	35.5	35.3
Average	78.0	76.5	Average	35.4	35.2
Std. Dev.	0.561	0.700	Std. Dev	0.356	0.162

Brightness without Fluorence, %

Tab Number			Tab Number		
9	77.9	76.3	9	35.3	35.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 9 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	68.8	70.5	1	69.0	67.2
2	68.7	70.2	2	68.7	66.8
3	69.2	71.0	3	69.1	67.3
4	68.7	70.5	4	68.7	67.0
5	67.9	70.1	5	68.7	67.3
6	68.1	70.0	6	68.8	66.8
7	68.3	70.2	7	69.2	67.5
8	68.5	70.5	8	69.4	67.8
9	69.0	70.5	9	69.3	67.7
Average	68.6	70.4	Average	69.0	67.3
Std. Dev.	0.421	0.302	Std. Dev	0.276	0.361

Brightness without Fluorence, %

Tab Number			Tab Number		
9	68.8	70.4	9	66.7	65.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 9 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	78.2	77.0	1	37.7	36.3
2	78.4	77.0	2	37.9	35.9
3	78.8	77.6	3	37.3	35.8
4	78.0	76.5	4	37.2	35.9
5	77.6	76.3	5	37.2	36.2
6	78.5	77.3	6	37.6	36.1
7	78.4	76.4	7	37.5	35.8
8	79.0	77.3	8	37.2	35.7
9	79.4	77.4	9	37.3	35.8
Average	78.5	77.0	Average	37.4	35.9
Std. Dev.	0.538	0.474	Std. Dev	0.255	0.207

Brightness without Fluorence, %

Tab Number			Tab Number		
9	79.0	77.1	9	37.2	35.8

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 9 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	72.3	71.2	1	68.4	68.6
2	71.7	71.2	2	68.4	68.7
3	71.8	71.3	3	69.0	69.5
4	71.8	71.4	4	68.6	68.6
5	71.4	70.9	5	68.2	68.9
6	71.6	71.1	6	68.1	69.6
7	72.1	71.4	7	68.6	68.9
8	72.0	71.7	8	68.6	68.7
9	72.3	71.6	9	68.5	68.8
Average	71.9	71.3	Average	68.5	68.9
Std. Dev.	0.310	0.247	Std. Dev	0.262	0.373

Brightness without Fluorence, %

Tab Number			Tab Number		
9	72.1	71.4	9	66.0	66.3

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 9 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	4	6		4	6
Tab Number			Tab Number		
1	78.6	77.2	1	36.9	35.5
2	78.4	76.9	2	36.5	35.5
3	79.5	77.8	3	36.6	35.3
4	78.7	77.2	4	37.0	35.3
5	78.4	76.9	5	36.8	31.2
6	79.2	77.9	6	36.9	33.7
7	78.7	77.3	7	36.7	35.1
8	78.5	76.9	8	36.6	34.8
9	78.6	77.2	9	36.9	35.1
Average	78.7	77.3	Average	36.8	34.6
Std. Dev.	0.374	0.371	Std. Dev	0.173	1.392

Brightness without Fluorence, %

Tab Number			Tab Number		
9	78.3	77.0	9	36.8	35.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 12 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	9	14		9	14
Tab Number			Tab Number		
1	67.8	69.4	1	67.2	68.2
2	67.8	69.3	2	67.1	68.3
3	68.2	69.9	3	67.6	68.4
4	68.4	70.0	4	67.8	68.8
5	67.9	69.7	5	67.3	68.1
6	68.7	70.0	6	67.5	68.5
7	69.0	70.8	7	68.5	69.2
8	68.2	69.8	8	67.4	68.4
9	68.7	70.5	9	67.9	69.1
Average	68.3	69.9	Average	67.6	68.6
Std. Dev.	0.433	0.480	Std. Dev	0.431	0.391

Brightness without Fluorence, %

Tab Number			Tab Number		
9	68.5	70.3	9	65.6	66.9

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 12 days

Brightness, %

Sheet #	BOOK PART LETTER K 9	BOOK PART LETTER K 14	Tab Number	BOOK PART LETTER M 9	BOOK PART LETTER M 14
Tab Number			Tab Number		
1	77.0	75.6	1	36.4	35.8
2	77.1	75.7	2	36.5	35.4
3	77.2	75.4	3	36.5	35.3
4	77.9	76.1	4	36.3	35.5
5	77.4	75.6	5	36.6	35.6
6	77.3	75.8	6	36.8	35.5
7	78.5	76.9	7	35.7	35.1
8	77.5	75.7	8	36.8	35.7
9	77.9	76.4	9	36.3	35.7
Average	77.5	75.9	Average	36.4	35.5
Std. Dev.	0.482	0.476	Std. Dev	0.332	0.220

Brightness without Fluorence, %

Tab Number			Tab Number		
9	77.6	76.1	9	36.1	35.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 12 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	9	14		9	14
Tab Number			Tab Number		
1	68.8	69.2	1	66.5	65.7
2	67.9	68.9	2	66.5	65.0
3	68.3	69.1	3	67.4	64.9
4	68.5	69.5	4	67.0	65.8
5	68.3	68.8	5	66.8	65.4
6	68.4	69.3	6	67.2	65.5
7	68.9	69.9	7	67.4	66.1
8	68.4	69.4	8	67.0	65.6
9	68.9	69.6	9	67.5	65.7
Average	68.5	69.3	Average	67.0	65.5
Std. Dev.	0.330	0.346	Std. Dev	0.377	0.380

Brightness without Fluorence, %

Tab Number			Tab Number		
9	68.7	69.3	9	65.5	63.8

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 12 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	9	14		9	14
Tab Number			Tab Number		
1	77.3	75.7	1	37.3	34.3
2	77.0	75.2	2	34.4	34.4
3	77.1	75.5	3	37.2	34.3
4	77.3	75.7	4	36.9	34.2
5	77.1	75.5	5	37.2	34.6
6	77.4	75.6	6	37.3	34.7
7	78.1	76.4	7	36.5	34.1
8	77.6	75.7	8	36.7	34.8
9	77.8	76.0	9	37.0	34.6
Average	77.4	75.7	Average	36.7	34.4
Std. Dev.	0.362	0.339	Std. Dev	0.913	0.240

Brightness without Fluorence, %

Tab Number			Tab Number		
9	77.4	75.8	9	36.7	34.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 12 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	9	14		9	14
Tab Number			Tab Number		
1	70.4	70.6	1	67.9	68.5
2	69.7	70.3	2	68.0	68.4
3	70.0	70.8	3	68.2	68.5
4	71.0	71.0	4	68.2	68.4
5	69.2	70.4	5	67.9	68.3
6	69.8	70.8	6	68.4	68.3
7	71.6	71.5	7	68.4	69.1
8	69.3	70.4	8	67.8	68.3
9	70.4	71.2	9	68.4	68.8
Average	70.2	70.8	Average	68.1	68.5
Std. Dev.	0.784	0.402	Std. Dev	0.240	0.271

Brightness without Fluorence, %

Tab Number			Tab Number		
9	70.2	71.0	9	66.1	66.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 12 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	9	14		9	14
Tab Number			Tab Number		
1	77.9	76.3	1	36.5	34.2
2	77.8	75.9	2	36.8	34.3
3	78.3	76.4	3	36.9	33.9
4	77.9	76.1	4	36.7	33.6
5	77.8	75.8	5	36.5	33.7
6	78.0	76.2	6	36.2	32.9
7	78.5	76.8	7	36.0	33.2
8	77.9	75.8	8	36.3	33.8
9	78.4	76.6	9	36.7	33.3
Average	78.1	76.2	Average	36.5	33.7
Std. Dev.	0.270	0.352	Std. Dev	0.298	0.461

Brightness without Fluorence, %

Tab Number			Tab Number		
9	78.2	76.2	9	36.7	33.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 18 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	67.1	68.9	1	66.8	63.6
2	67.1	68.5	2	66.4	63.1
3	65.6	68.1	3	66.3	63.2
4	67.2	69.3	4	67.8	64.7
5	67.2	68.7	5	66.6	64.2
6	68.0	69.4	6	66.8	64.2
7	67.8	70.0	7	67.1	66.4
8	66.9	68.5	8	66.7	64.9
9	67.5	69.0	9	67.0	64.5
Average	67.2	68.9	Average	66.8	64.3
Std. Dev.	0.684	0.572	Std. Dev	0.444	1.008

Brightness without Fluorence, %

Tab Number			Tab Number		
9	67.3	68.8	9	65.0	62.7

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 18 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	77.1	75.8	1	32.9	33.7
2	76.5	75.3	2	33.1	33.5
3	76.7	75.5	3	32.5	33.2
4	77.6	76.3	4	32.5	33.4
5	77.4	75.3	5	32.6	33.6
6	77.4	75.6	6	32.2	33.3
7	78.3	77.2	7	31.4	33.8
8	76.8	76.6	8	32.0	33.6
9	77.4	76.0	9	32.2	33.2
Average	77.2	76.0	Average	32.4	33.5
Std. Dev.	0.546	0.642	Std. Dev	0.504	0.217

Brightness without Fluorence, %

Tab Number			Tab Number		
9	77.2	75.7	9	31.8	33.1

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 18 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	66.0	67.6	1	65.0	63.9
2	65.7	67.0	2	64.3	63.7
3	64.7	66.6	3	63.8	62.6
4	66.1	67.8	4	65.3	64.6
5	66.2	67.7	5	65.0	63.7
6	66.2	67.8	6	65.5	63.9
7	66.9	68.6	7	65.8	65.5
8	66.7	68.5	8	65.5	65.0
9	66.9	68.5	9	65.5	65.0
Average	66.2	67.8	Average	65.1	64.2
Std. Dev.	0.686	0.685	Std. Dev	0.648	0.892

Brightness without Fluorence, %

Tab Number			Tab Number		
9	66.6	68.3	9	63.8	63.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 18 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	75.3	73.7	1	34.7	32.3
2	75.2	73.4	2	35.2	32.9
3	74.6	72.6	3	35.3	32.2
4	76.2	74.3	4	34.6	32.3
5	75.8	74.1	5	35.0	32.5
6	76.0	74.2	6	35.2	32.2
7	77.2	75.0	7	34.7	32.3
8	76.7	74.3	8	34.8	32.4
9	77.1	74.6	9	35.2	32.4
Average	76.0	74.0	Average	35.0	32.4
Std. Dev.	0.888	0.707	Std. Dev	0.269	0.215

Brightness without Fluorence, %

Tab Number			Tab Number		
9	76.9	74.4	9	35.2	32.3

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 18 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	66.4	67.7	1	66.6	65.1
2	66.1	67.7	2	66.4	64.7
3	64.2	66.9	3	66.0	63.9
4	66.5	68.1	4	66.8	63.7
5	66.5	68.0	5	66.7	63.8
6	63.9	68.2	6	66.9	64.3
7	67.5	68.8	7	67.6	64.9
8	66.6	68.1	8	67.1	64.0
9	67.5	69.1	9	68.0	64.8
Average	66.1	68.1	Average	66.9	64.4
Std. Dev.	1.276	0.638	Std. Dev	0.606	0.529

Brightness without Fluorence, %

Tab Number			Tab Number		
9	67.1	68.9	9	65.9	63.3

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 18 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	1	5		1	5
Tab Number			Tab Number		
1	75.2	73.3	1	34.6	32.0
2	75.1	73.0	2	34.8	32.3
3	74.4	72.8	3	34.7	31.7
4	75.4	73.6	4	34.7	32.0
5	75.8	74.2	5	34.8	31.6
6	76.2	74.5	6	34.8	31.8
7	76.3	74.2	7	34.2	31.7
8	75.7	73.9	8	34.2	31.5
9	77.1	75.0	9	34.2	31.4
Average	75.7	73.8	Average	34.6	31.8
Std. Dev.	0.788	0.723	Std. Dev	0.274	0.282

Brightness without Fluorence, %

Tab Number			Tab Number		
9	76.8	74.7	9	34.1	31.1

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 24 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	65.0	66.4	1	65.5	64.6
2	63.4	65.4	2	64.4	63.0
3	63.0	64.4	3	63.7	61.9
4	65.5	67.0	4	66.0	65.0
5	63.9	65.9	5	65.1	63.7
6	64.0	65.7	6	65.1	62.5
7	66.5	67.6	7	66.5	65.3
8	65.7	66.7	8	65.9	64.1
9	65.3	66.2	9	65.3	63.0
Average	64.7	66.1	Average	65.3	63.7
Std. Dev.	1.175	0.941	Std. Dev	0.850	1.166

Brightness without Fluorence, %

Tab Number			Tab Number		
9	65.0	65.9	9	63.3	61.3

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 24 days

Brightness, %

	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	76.5	77.0	1	32.4	30.4
2	75.9	75.6	2	32.4	30.4
3	75.1	74.0	3	32.4	30.3
4	77.0	77.1	4	32.5	30.6
5	76.4	76.3	5	32.5	30.4
6	76.1	75.1	6	32.6	30.3
7	77.1	76.9	7	32.8	30.8
8	76.3	76.3	8	32.5	29.8
9	76.2	75.4	9	32.8	30.4
Average	76.3	76.0	Average	32.5	30.4
Std. Dev.	0.595	1.032	Std. Dev	0.159	0.268

Brightness without Fluorence, %

Tab Number			Tab Number		
9	75.9	75.0	9	32.7	30.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 24 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	63.8	65.4	1	64.1	59.9
2	63.1	64.7	2	63.7	59.3
3	62.5	63.9	3	62.6	58.3
4	64.0	65.3	4	64.3	60.4
5	63.7	65.5	5	64.1	60.4
6	63.5	65.1	6	64.4	59.7
7	64.6	66.3	7	65.2	60.3
8	63.9	65.9	8	64.8	60.4
9	65.2	66.7	9	65.3	60.3
Average	63.8	65.4	Average	64.3	59.9
Std. Dev.	0.785	0.836	Std. Dev	0.821	0.710

Brightness without Fluorence, %

Tab Number			Tab Number		
9	65.0	66.3	9	63.5	59.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 24 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	73.7	71.5	1	31.9	32.2
2	72.9	71.0	2	31.8	32.0
3	72.7	70.2	3	31.3	31.9
4	73.6	71.2	4	31.9	32.0
5	73.8	71.7	5	31.0	31.8
6	73.6	71.7	6	31.6	31.8
7	74.4	71.8	7	32.1	32.6
8	74.1	72.1	8	31.7	32.0
9	74.8	72.6	9	31.1	31.7
Average	73.7	71.5	Average	31.6	32.0
Std. Dev.	0.663	0.686	Std. Dev	0.384	0.269

Brightness without Fluorence, %

Tab Number			Tab Number		
9	74.6	72.4	9	31.1	31.7

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 24 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	63.9	66.0	1	63.9	61.6
2	62.9	65.2	2	63.1	60.6
3	62.5	64.8	3	63.0	60.1
4	63.9	66.1	4	64.9	61.7
5	63.5	65.7	5	64.3	61.1
6	63.4	65.8	6	64.2	61.3
7	64.9	66.9	7	64.9	62.1
8	64.6	66.4	8	65.1	62.4
9	64.1	66.2	9	64.9	61.4
Average	63.7	65.9	Average	64.3	61.4
Std. Dev.	0.765	0.626	Std. Dev	0.791	0.711

Brightness without Fluorence, %

Tab Number			Tab Number		
9	63.9	66.0	9	62.9	60.0

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 24 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	8	13		8	13
Tab Number			Tab Number		
1	73.3	71.1	1	31.5	31.7
2	72.4	69.9	2	31.7	31.5
3	72.3	70.1	3	31.3	31.5
4	73.4	71.1	4	30.7	31.4
5	72.9	70.9	5	31.2	31.0
6	72.7	70.2	6	30.7	31.1
7	74.2	72.0	7	31.3	31.7
8	73.8	71.7	8	30.6	31.3
9	73.4	71.3	9	31.1	31.3
Average	73.2	70.9	Average	31.1	31.4
Std. Dev.	0.635	0.726	Std. Dev	0.383	0.242

Brightness without Fluorence, %

Tab Number			Tab Number		
9	73.2	70.9	9	30.9	31.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 30 days

Brightness, %

	BOOK PART LETTER G			BOOK PART LETTER H	
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	61.3	63.0	1	61.5	57.1
2	60.8	62.6	2	61.6	56.9
3	61.3	62.8	3	61.5	57.0
4	61.7	63.3	4	62.0	57.5
5	61.0	62.9	5	61.5	57.0
6	61.6	63.2	6	61.7	57.8
7	61.4	64.0	7	62.7	58.3
8	60.6	63.3	8	62.0	57.8
9	62.0	64.4	9	62.8	58.6
Average	61.3	63.3	Average	61.9	57.6
Std. Dev.	0.444	0.580	Std. Dev	0.509	0.615

Brightness without Fluorence, %

Tab Number			Tab Number		
9	61.9	64.1	9	61.2	57.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303598

Aging Time: 30 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	71.1	69.0	1	30.9	31.3
2	71.2	69.1	2	30.4	31.3
3	71.4	69.0	3	31.1	31.3
4	71.2	68.7	4	30.6	31.6
5	71.2	69.0	5	30.6	31.6
6	71.9	69.8	6	30.1	30.5
7	71.8	69.7	7	30.1	30.9
8	71.6	69.1	8	30.3	31.3
9	73.1	70.8	9	30.3	30.7
Average	71.6	69.4	Average	30.5	31.2
Std. Dev.	0.627	0.646	Std. Dev	0.344	0.384

Brightness without Fluorence, %

Tab Number			Tab Number		
9	72.7	70.5	9	30.2	30.5

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 30 days

Brightness, %

Book Part Letter G			Book Part Letter H		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	61.8	63.3	1	62.5	57.1
2	60.9	62.2	2	61.4	56.8
3	61.2	62.0	3	61.4	57.4
4	61.9	63.2	4	62.5	57.8
5	61.6	62.9	5	62.3	57.3
6	62.6	64.0	6	62.7	58.5
7	62.7	63.9	7	62.7	58.8
8	61.8	63.3	8	62.4	58.0
9	62.4	63.9	9	63.0	58.6
Average	61.9	63.2	Average	62.3	57.8
Std. Dev.	0.610	0.722	Std. Dev	0.561	0.713

Brightness without Fluorence, %

Tab Number			Tab Number		
9	62.2	63.7	9	61.1	57.2

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303599

Aging Time: 30 days

Brightness, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	73.0	71.3	1	32.3	31.3
2	71.9	69.7	2	31.8	30.4
3	72.2	70.4	3	31.8	30.2
4	72.8	71.9	4	31.4	30.8
5	72.4	70.9	5	31.9	30.7
6	73.6	71.5	6	31.4	30.0
7	74.0	73.1	7	31.5	30.8
8	72.9	71.2	8	31.6	30.1
9	73.2	71.4	9	31.6	29.8
Average	72.9	71.3	Average	31.7	30.5
Std. Dev.	0.666	0.947	Std. Dev	0.287	0.480

Brightness without Fluorence, %

Tab Number			Tab Number		
9	72.8	71.2	9	31.6	29.6

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 30 days

Brightness, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	61.2	62.7	1	61.6	58.1
2	60.5	62.0	2	61.1	57.6
3	60.2	61.9	3	61.2	57.4
4	61.1	62.7	4	61.6	58.0
5	60.8	62.2	5	61.3	58.1
6	60.8	62.9	6	61.8	58.8
7	61.7	63.4	7	62.5	58.8
8	61.0	62.9	8	62.1	58.8
9	61.8	64.0	9	63.1	58.8
Average	61.0	62.7	Average	61.8	58.3
Std. Dev.	0.518	0.673	Std. Dev	0.657	0.555

Brightness without Fluorence, %

Tab Number			Tab Number		
9	61.6	63.7	9	61.3	58.8

LIBRARY OF CONGRESS

BRIGHTNESS DATA

CONTROL NUMBER 303597

Aging Time: 30 days

Brightness, %

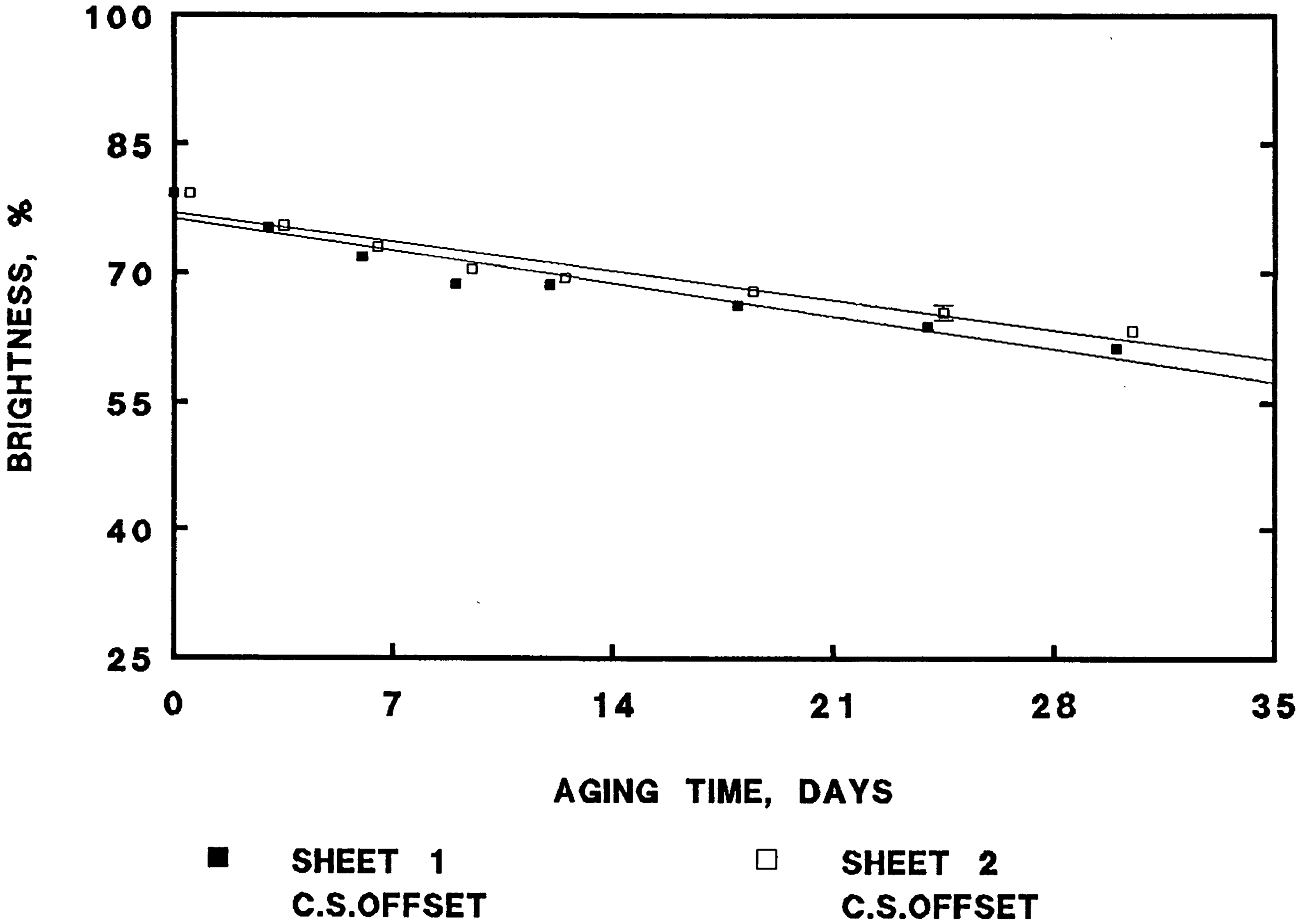
BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	70.0	67.6	1	30.5	30.7
2	69.7	67.2	2	30.3	30.1
3	70.1	67.7	3	30.2	30.1
4	70.0	67.7	4	29.7	30.5
5	70.2	67.7	5	29.9	30.6
6	71.2	67.8	6	29.3	30.1
7	70.7	68.3	7	29.9	30.9
8	70.5	68.0	8	29.9	30.4
9	72.3	69.7	9	29.5	30.2
Average	70.5	68.0	Average	29.9	30.4
Std. Dev.	0.803	0.714	Std. Dev	0.382	0.296

Brightness without Fluorence, %

Tab Number			Tab Number		
9	72.0	69.5	9	29.5	30.1

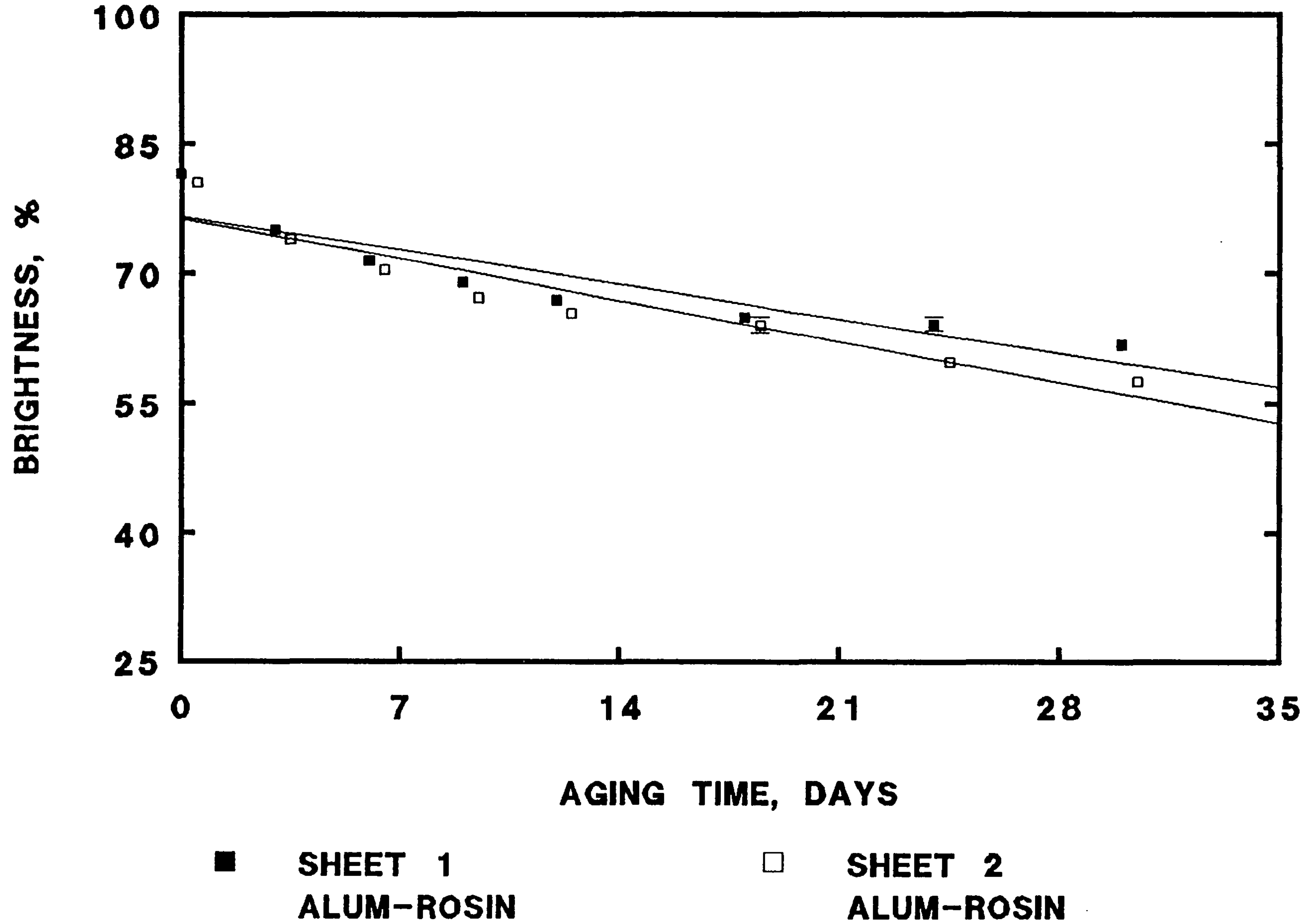
LIBRARY OF CONGRESS

CONTROL NUMBER 303598



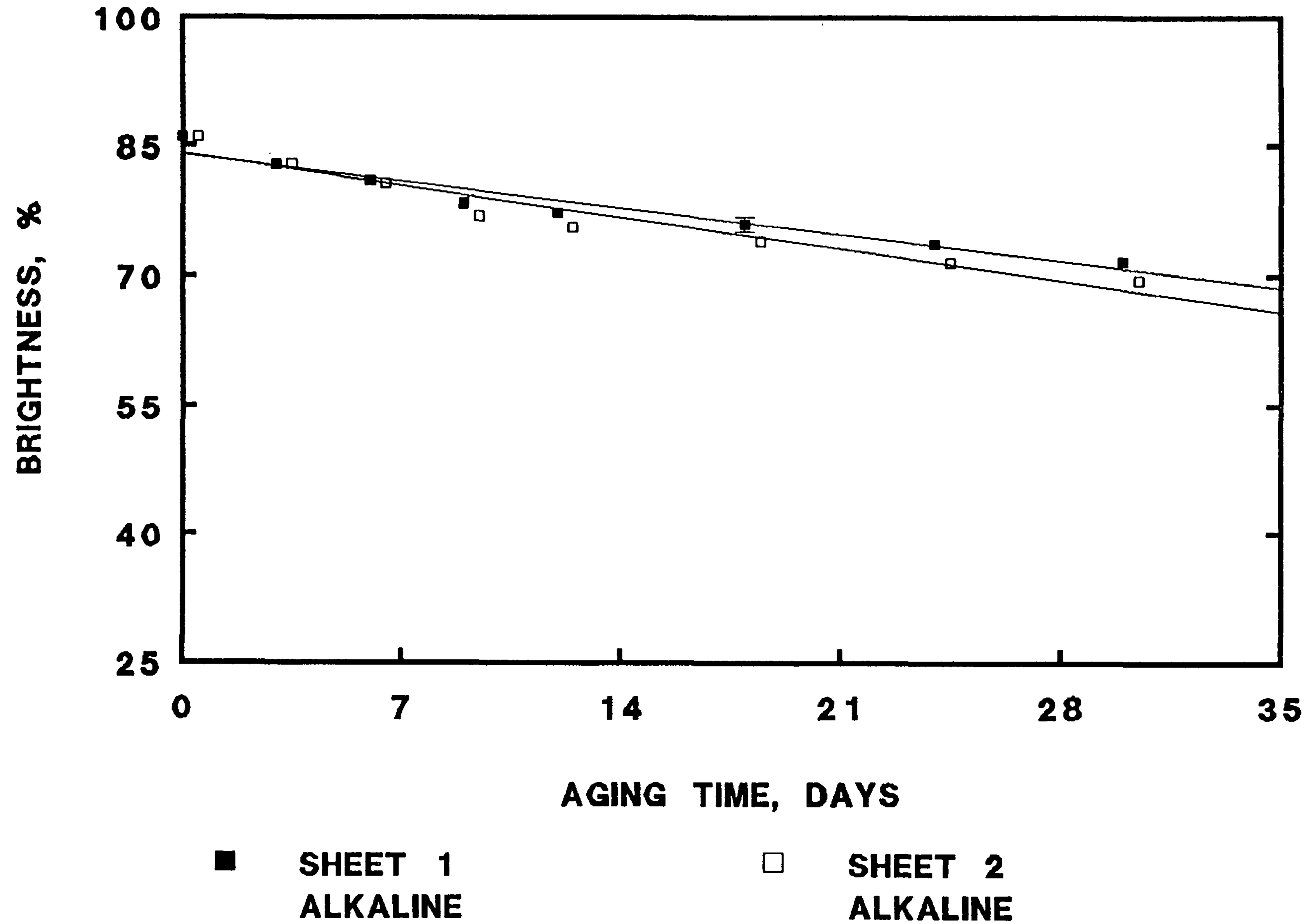
LIBRARY OF CONGRESS

CONTROL NUMBER 303598

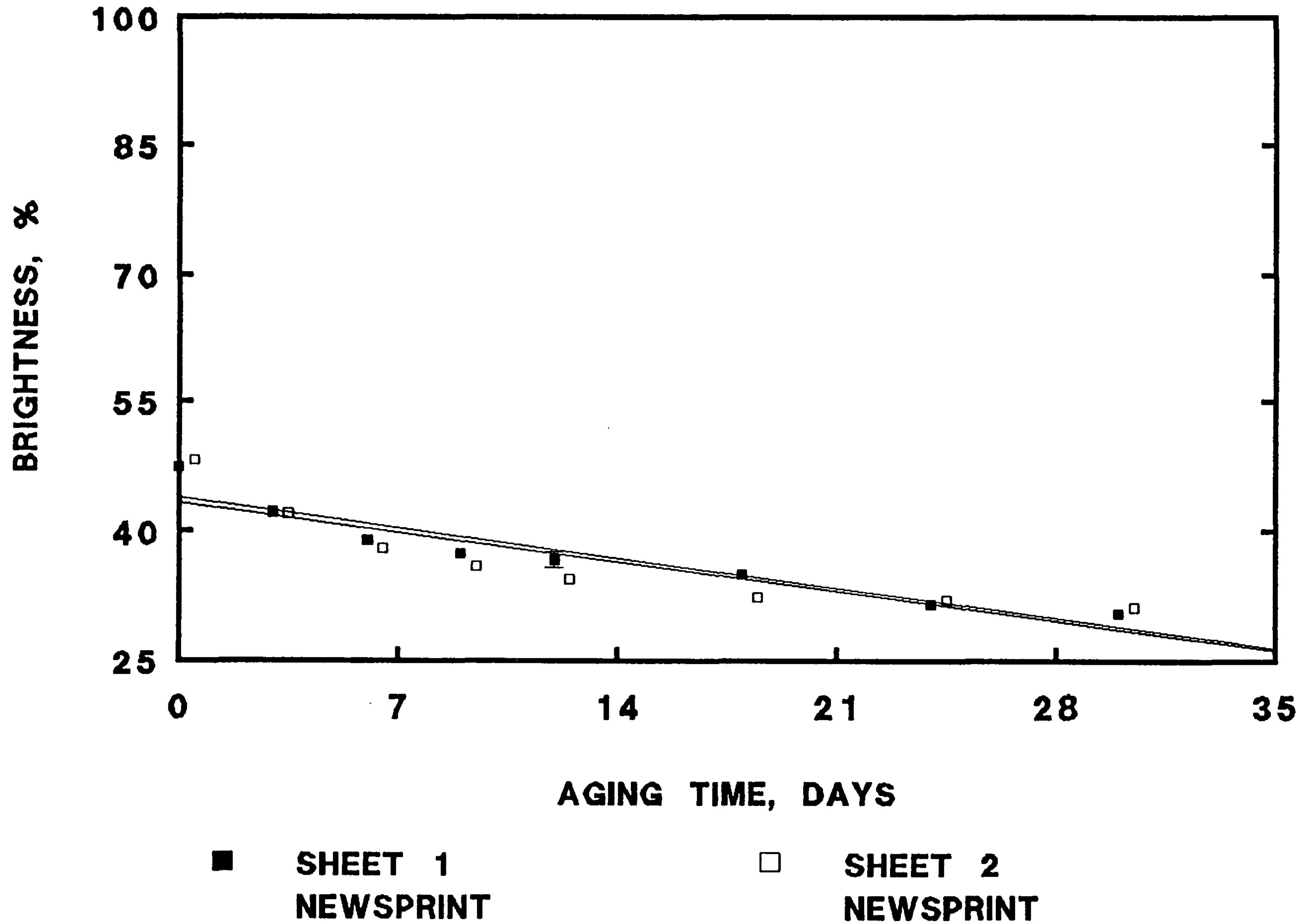


LIBRARY CONGRESS

CONTROL NUMBER 303598

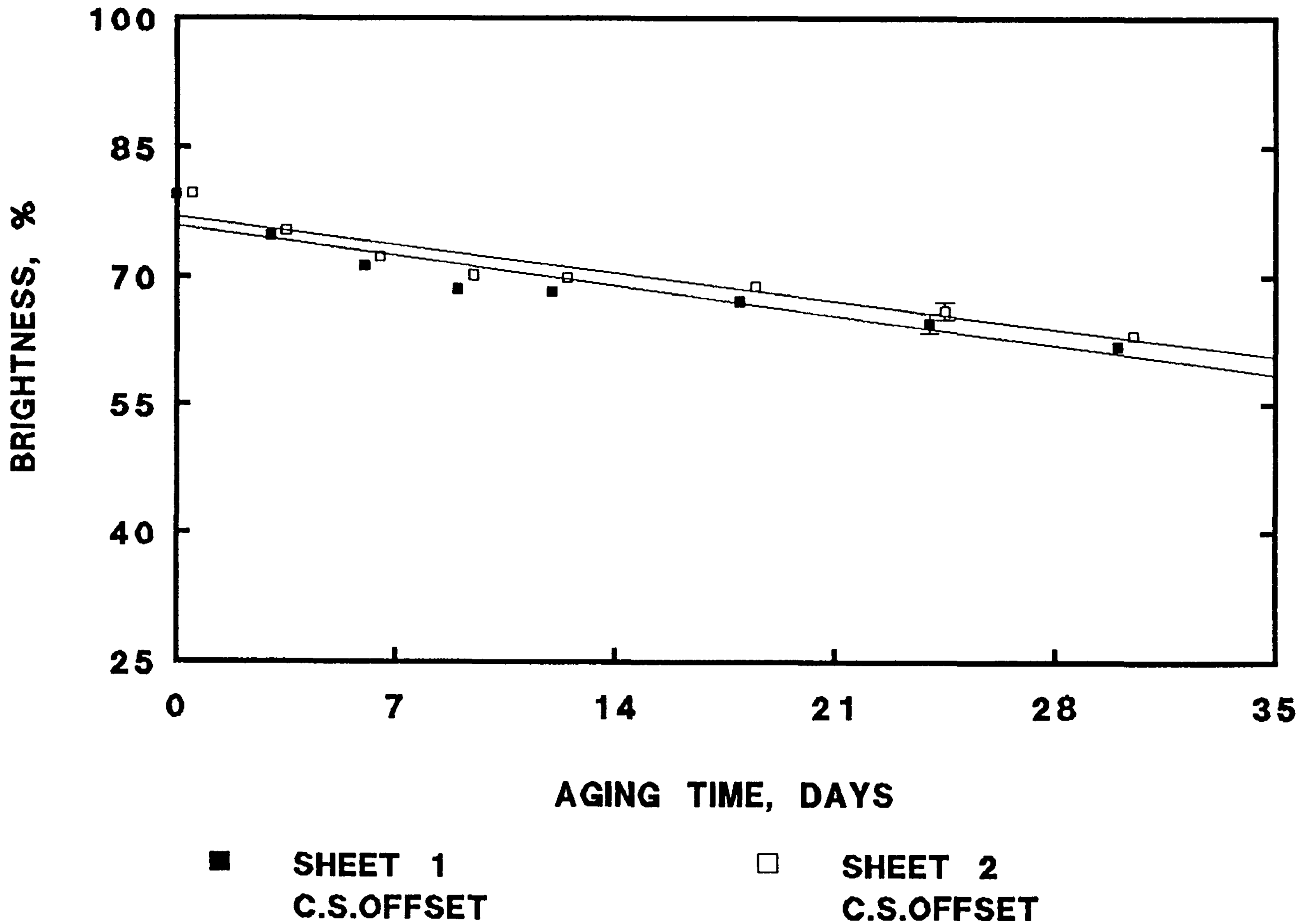


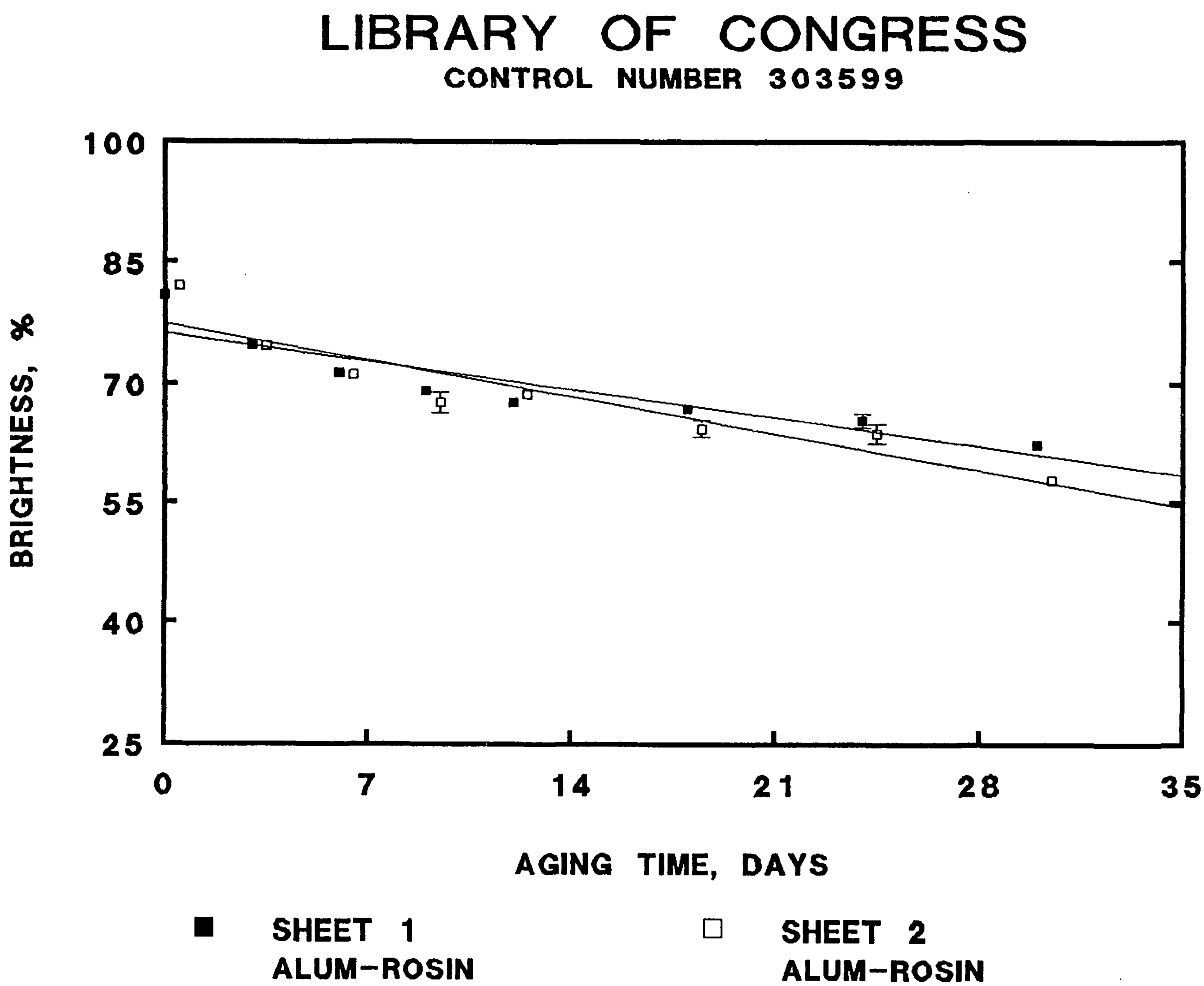
LIBRARY OF CONGRESS
CONTROL NUMBER 303598

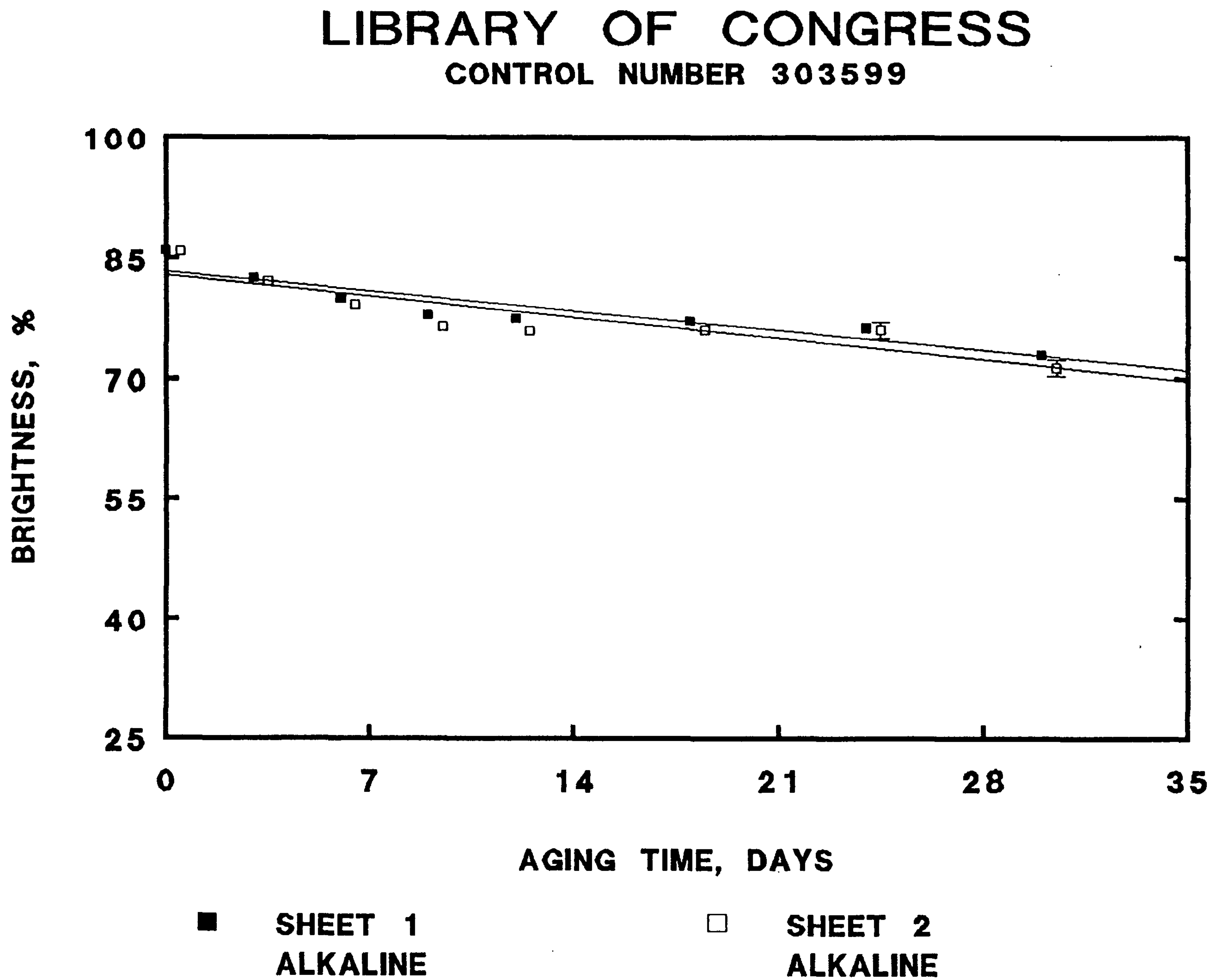


LIBRARY OF CONGRESS

CONTROL NUMBER 303599

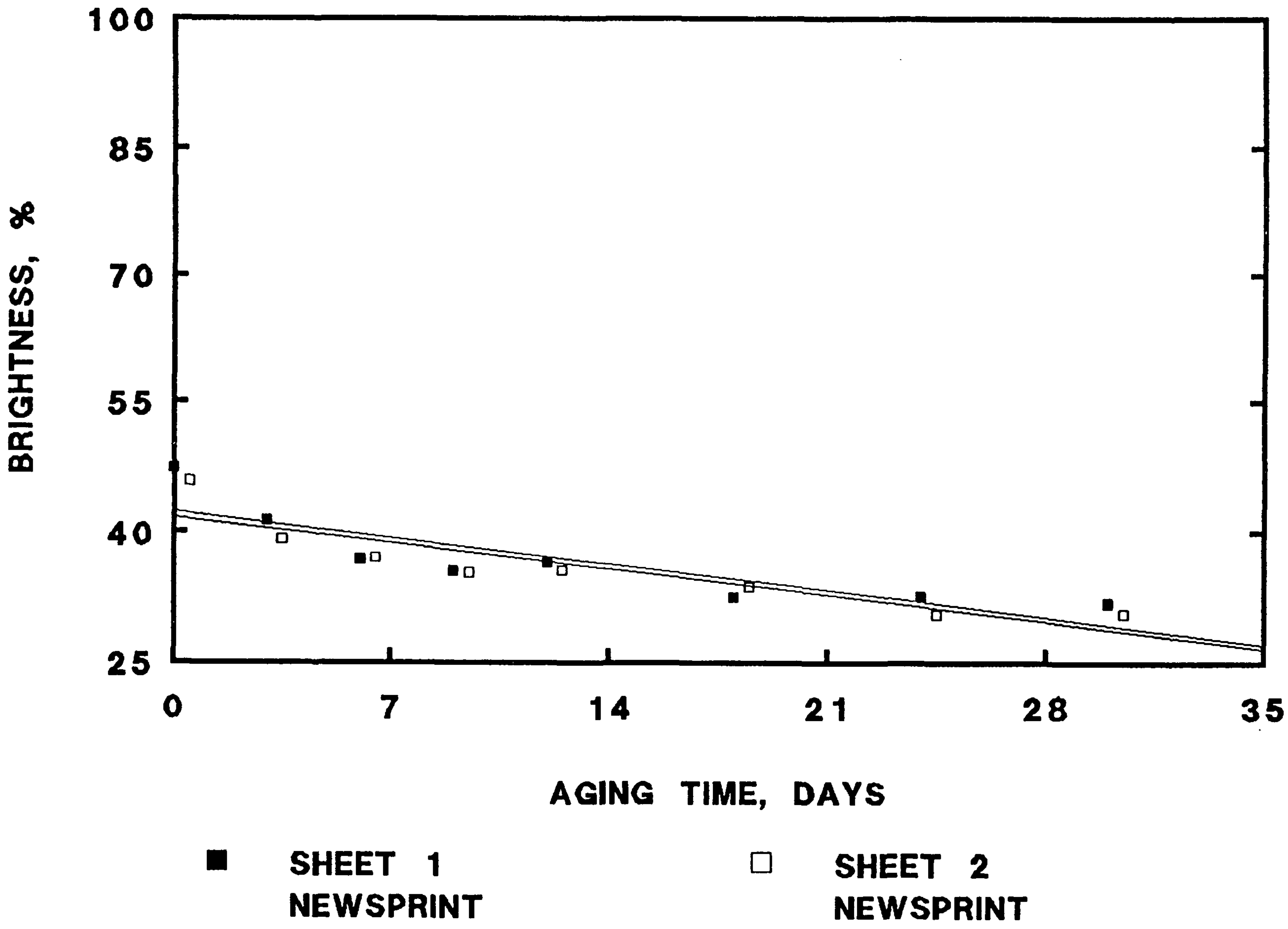



LIBRARY OF CONGRESS
CONTROL NUMBER 303599
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALUM-ROSIN
SHEET 2
ALUM-ROSIN

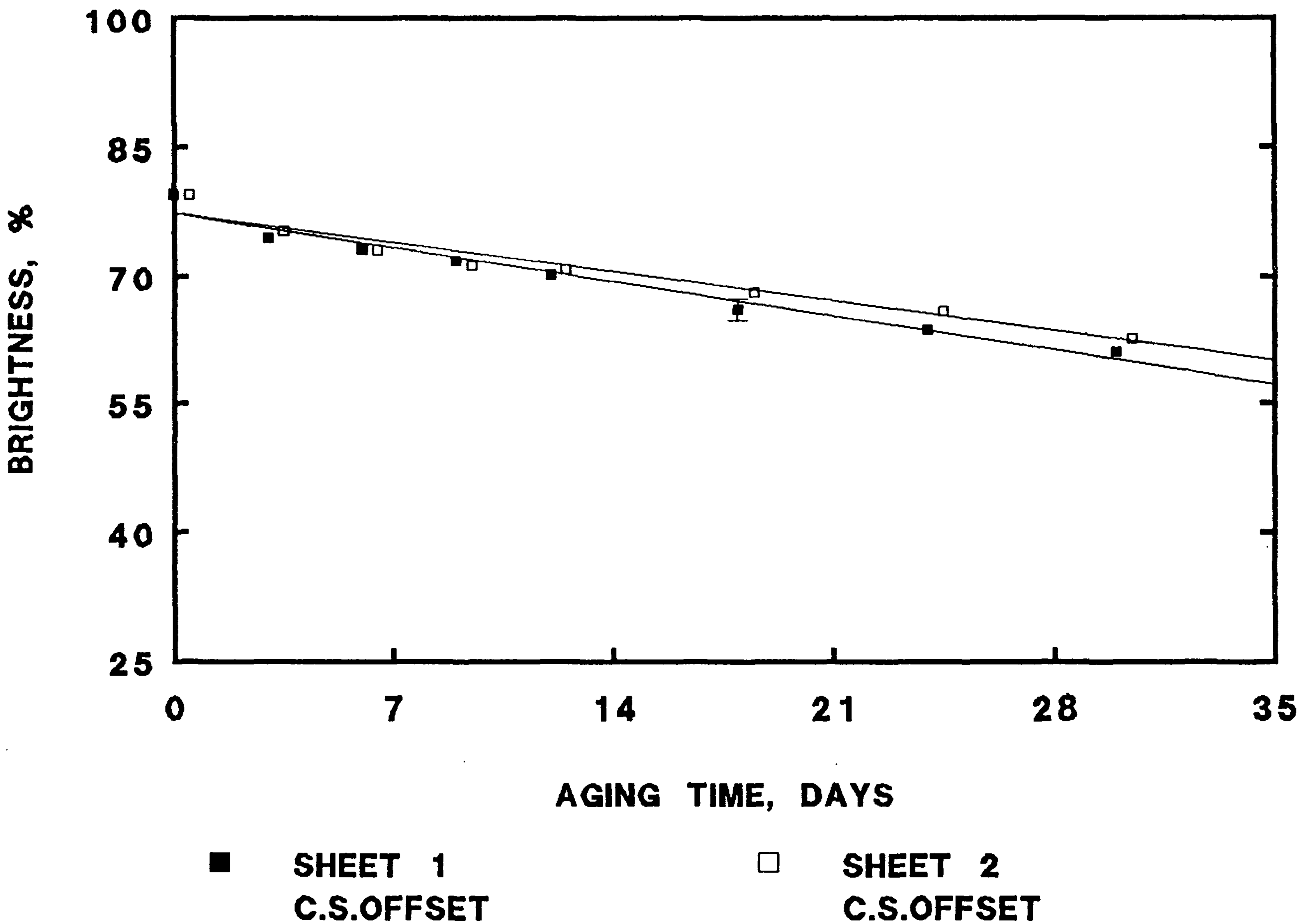


LIBRARY OF CONGRESS
CONTROL NUMBER 303599
BRIGHTNESS, %
100
85
70
55
40
25
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALKALINE
SHEET 2
ALKALINE

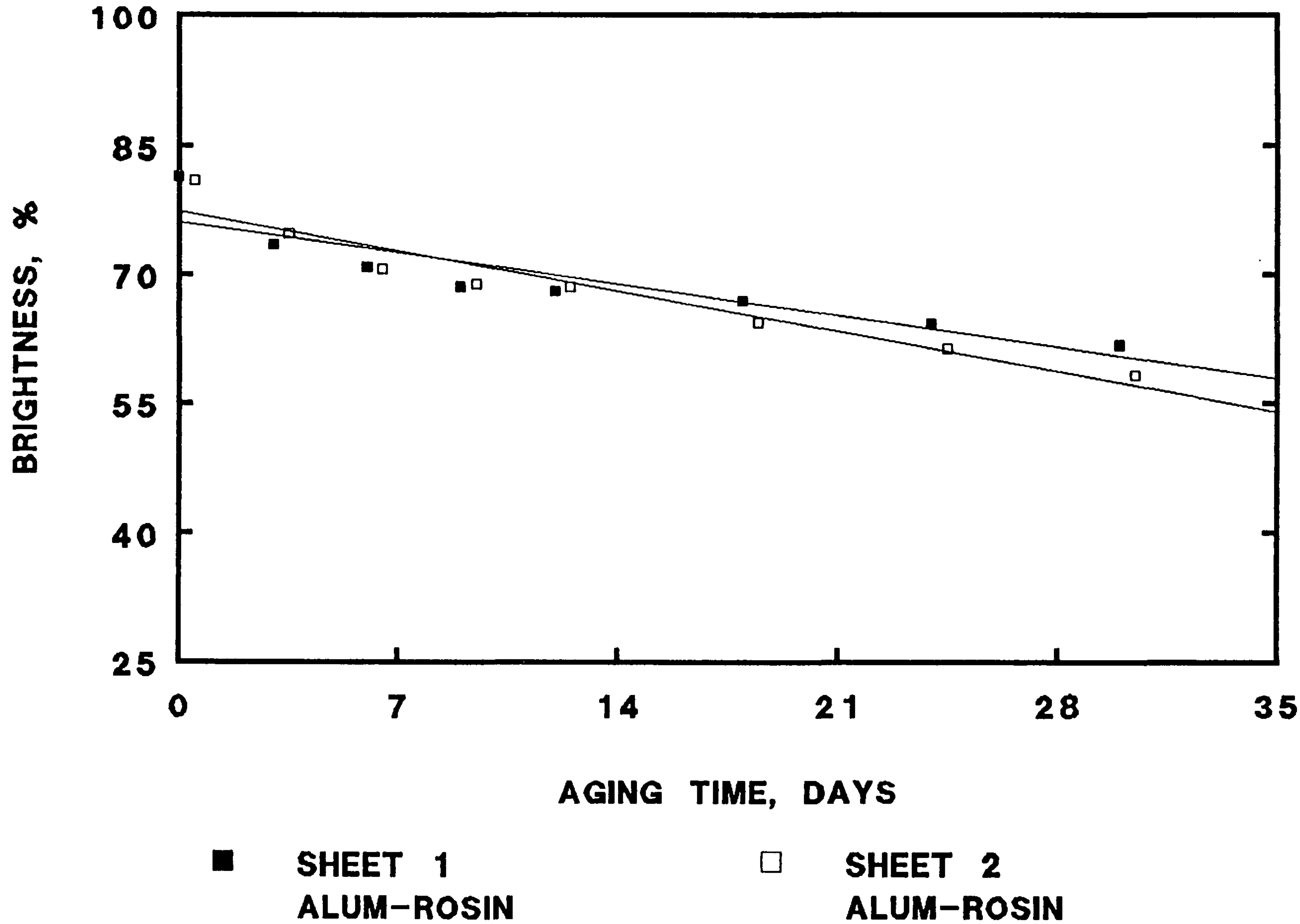
LIBRARY OF CONGRESS
CONTROL NUMBER 303599



LIBRARY OF CONGRESS
CONTROL NUMBER 303597

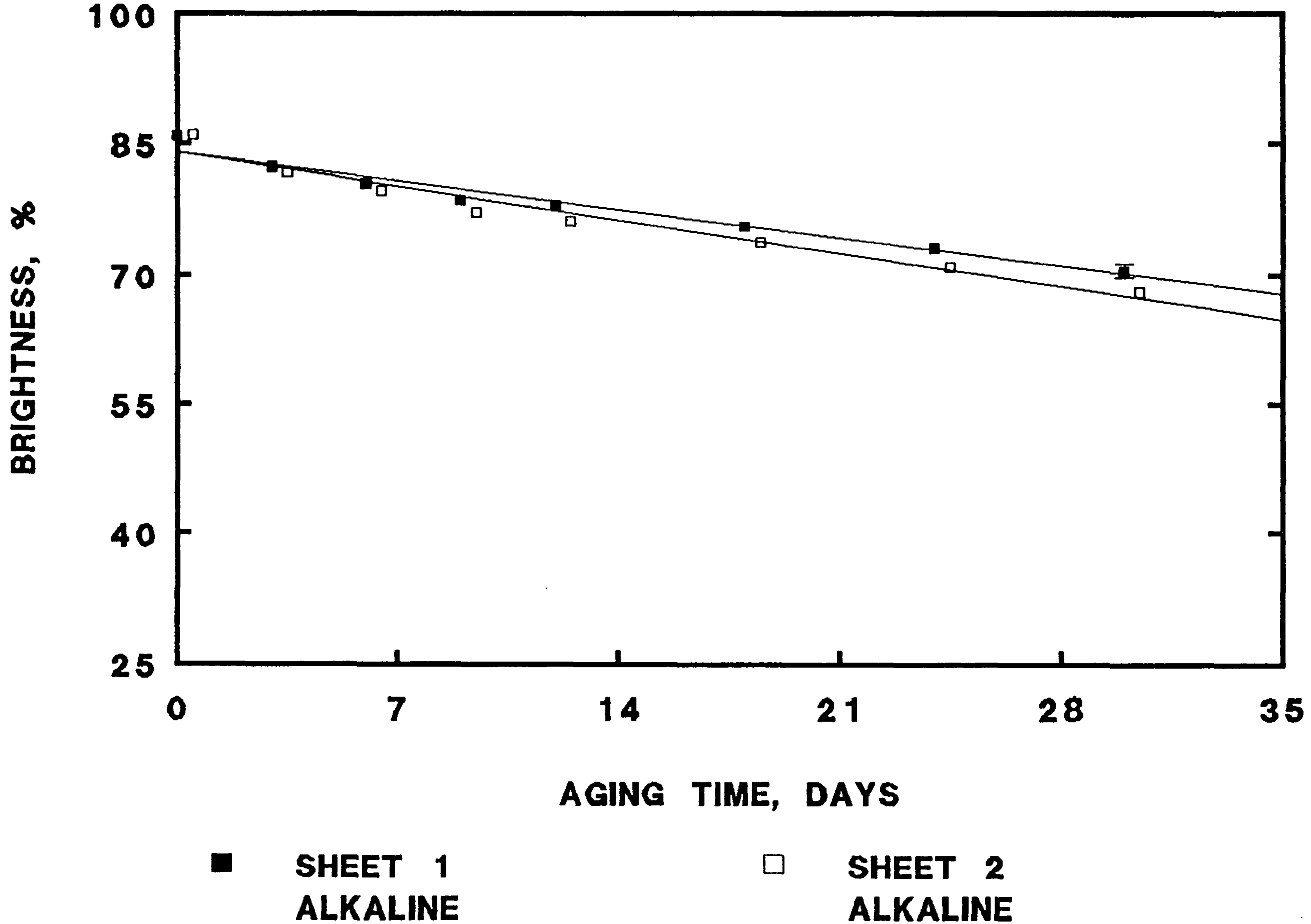


LIBRARY OF CONGRESS
CONTROL NUMBER 303597

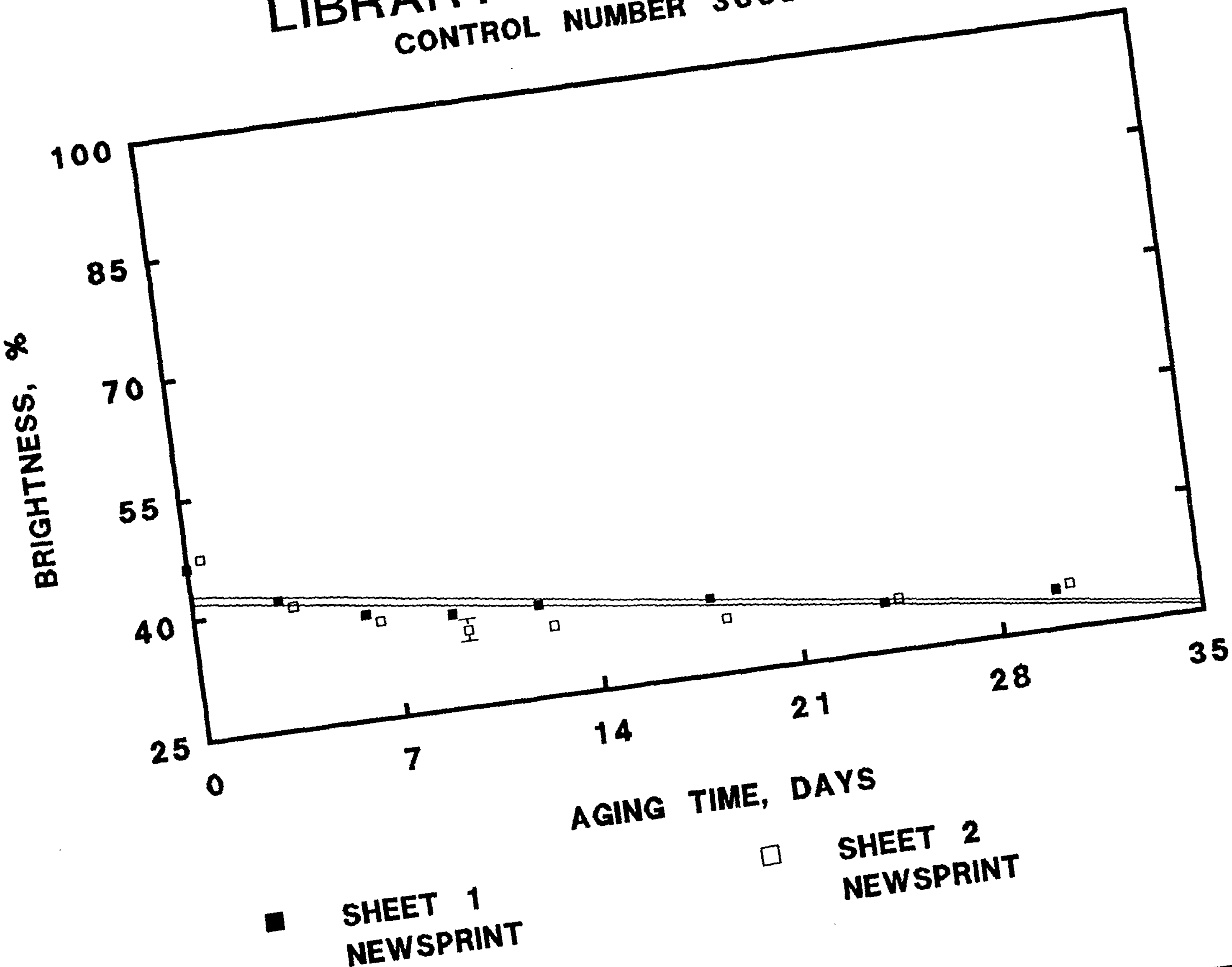


LIBRARY OF CONGRESS

CONTROL NUMBER 303597



LIBRARY OF CONGRESS
CONTROL NUMBER 303597



LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303599

Aging Time: 0 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	94.4	93.3	1	86.2	87.7
2	94.0	92.8	2	86.3	88.1
3	93.9	93.1	3	86.8	89.1
4	94.2	92.7	4	84.9	87.5
5	93.7	93.4	5	86.7	88.3
6	94.3	93.0	6	87.6	88.6
7	93.8	93.7	7	86.0	87.5
8	94.3	93.3	8	87.6	88.6
9	94.3	93.1	9	87.0	88.2
Average	94.1	93.2	Average	86.6	88.2
Std. Dev.	0.255	0.309	Std. Dev	0.844	0.545

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303599

Aging Time: 0 days

Opacity, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	93.9	94.0	1	88.8	88.2
2	94.4	93.7	2	88.3	88.5
3	93.8	93.9	3	89.0	88.8
4	93.7	94.0	4	88.3	88.1
5	94.1	93.9	5	87.6	88.5
6	93.8	94.2	6	87.7	88.6
7	93.7	94.0	7	86.6	88.6
8	94.3	93.9	8	88.9	89.6
9	94.0	93.8	9	86.6	88.6
Average	94.0	93.9	Average	88.0	88.6
Std. Dev.	0.255	0.141	Std. Dev	0.922	0.428

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303598

Aging Time: 0 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	93.3	93.3	1	88.2	87.5
2	93.5	92.9	2	88.9	87.5
3	92.8	92.8	3	88.4	86.0
4	93.7	92.9	4	88.0	88.3
5	92.6	93.7	5	89.4	87.2
6	92.7	93.0	6	89.7	85.4
7	93.8	93.4	7	89.7	86.2
8	93.3	92.9	8	88.6	86.3
9	92.7	93.4	9	89.0	86.7
Average	93.2	93.1	Average	88.9	86.8
Std. Dev.	0.464	0.313	Std. Dev	0.630	0.909

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303598

Aging Time: 0 days

Opacity, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	93.8	94.0	1	89.5	88.6
2	93.6	93.9	2	89.7	89.1
3	93.8	94.0	3	88.8	88.9
4	94.0	93.6	4	88.7	88.9
5	94.2	93.7	5	88.1	88.1
6	93.2	93.6	6	88.2	87.0
7	93.9	93.7	7	88.4	88.8
8	93.9	94.0	8	89.1	86.4
9	92.9	93.9	9	89.1	87.3
Average	93.7	93.8	Average	88.8	88.1
Std. Dev.	0.409	0.172	Std. Dev	0.557	0.985

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303597

Aging Time: 0 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	93.3	93.3	1	88.8	86.9
2	92.4	93.8	2	88.6	87.6
3	92.7	94.4	3	88.3	86.1
4	93.3	94.4	4	88.6	87.6
5	93.3	93.6	5	88.7	87.6
6	93.2	93.8	6	86.6	85.8
7	92.9	93.7	7	88.8	88.2
8	92.8	93.4	8	86.9	86.5
9	93.0	93.2	9	88.2	85.7
Average	93.0	93.7	Average	88.2	86.9
Std. Dev.	0.318	0.433	Std. Dev	0.832	0.909

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303597

Aging Time: 0 days

Opacity, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	11	16		11	16
Tab Number			Tab Number		
1	93.9	93.8	1	86.8	87.4
2	94.0	94.0	2	85.1	87.8
3	93.9	93.8	3	87.2	86.8
4	94.1	93.6	4	87.8	87.9
5	93.6	93.9	5	87.8	87.7
6	94.7	94.3	6	87.4	87.4
7	93.8	93.5	7	87.7	86.8
8	94.0	94.1	8	87.3	86.7
9	93.8	94.2	9	87.7	87.8
Average	94.0	93.9	Average	87.2	87.4
Std. Dev.	0.307	0.267	Std. Dev	0.854	0.482

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303598

Aging Time: 30 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	97.4	95.3	1	91.4	90.3
2	97.4	95.7	2	92.2	92.4
3	97.3	95.8	3	92.7	92.5
4	97.8	95.8	4	91.9	90.2
5	97.4	95.5	5	92.4	92.0
6	97.2	95.4	6	92.6	91.7
7	97.0	95.4	7	91.5	90.2
8	97.3	95.7	8	92.0	92.6
9	97.3	95.2	9	92.1	91.2
Average	97.3	95.5	Average	92.1	91.5
Std. Dev.	0.213	0.224	Std. Dev	0.448	1.013

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303598

Aging Time: 30 days

Opacity, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	96.2	96.7	1	92.7	93.7
2	96.1	96.6	2	92.9	91.0
3	96.2	96.6	3	92.0	91.9
4	96.6	96.6	4	92.7	92.1
5	96.1	96.3	5	93.1	92.0
6	96.2	96.3	6	93.2	92.6
7	95.9	96.4	7	93.2	93.0
8	96.4	96.5	8	92.5	93.0
9	96.1	96.3	9	92.5	92.4
Average	96.2	96.5	Average	92.8	92.4
Std. Dev.	0.200	0.156	Std. Dev	0.394	0.783

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303599

Aging Time: 30 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	97.9	95.8	1	91.5	90.8
2	97.8	95.8	2	92.6	90.8
3	97.8	96.4	3	92.4	92.2
4	97.7	95.7	4	90.5	89.6
5	97.9	95.7	5	92.9	90.0
6	97.1	94.8	6	92.6	90.6
7	97.9	95.7	7	91.5	89.0
8	97.6	95.4	8	92.6	89.8
9	97.5	95.3	9	92.1	91.4
Average	97.7	95.6	Average	92.1	90.5
Std. Dev.	0.262	0.435	Std. Dev	0.771	0.980

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303599

Aging Time: 30 days

Opacity, %

BOOK PART LETTER K			BOOK PART LETTER M		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	95.7	96.2	1	90.5	89.7
2	96.4	96.9	2	90.8	91.2
3	96.1	96.7	3	91.0	90.1
4	96.1	96.4	4	92.7	91.8
5	96.4	96.3	5	91.7	92.2
6	96.1	96.4	6	91.5	91.6
7	96.1	96.4	7	92.0	91.6
8	96.5	96.2	8	92.2	91.2
9	95.9	96.4	9	91.5	92.1
Average	96.1	96.4	Average	91.5	91.3
Std. Dev.	0.255	0.229	Std. Dev	0.702	0.858

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303597

Aging Time: 30 days

Opacity, %

BOOK PART LETTER G			BOOK PART LETTER H		
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	97.7	96.8	1	92.9	91.5
2	97.4	97.0	2	92.2	91.5
3	97.3	97.8	3	91.2	92.6
4	98.3	97.2	4	92.8	91.5
5	97.3	97.0	5	92.3	92.2
6	97.3	97.2	6	91.8	90.6
7	97.3	97.1	7	92.4	91.6
8	97.6	97.5	8	92.6	92.4
9	97.3	97.0	9	91.4	91.2
Average	97.5	97.2	Average	92.2	91.7
Std. Dev.	0.335	0.303	Std. Dev	0.597	0.626

LIBRARY OF CONGRESS

OPACITY DATA

CONTROL NUMBER 303597

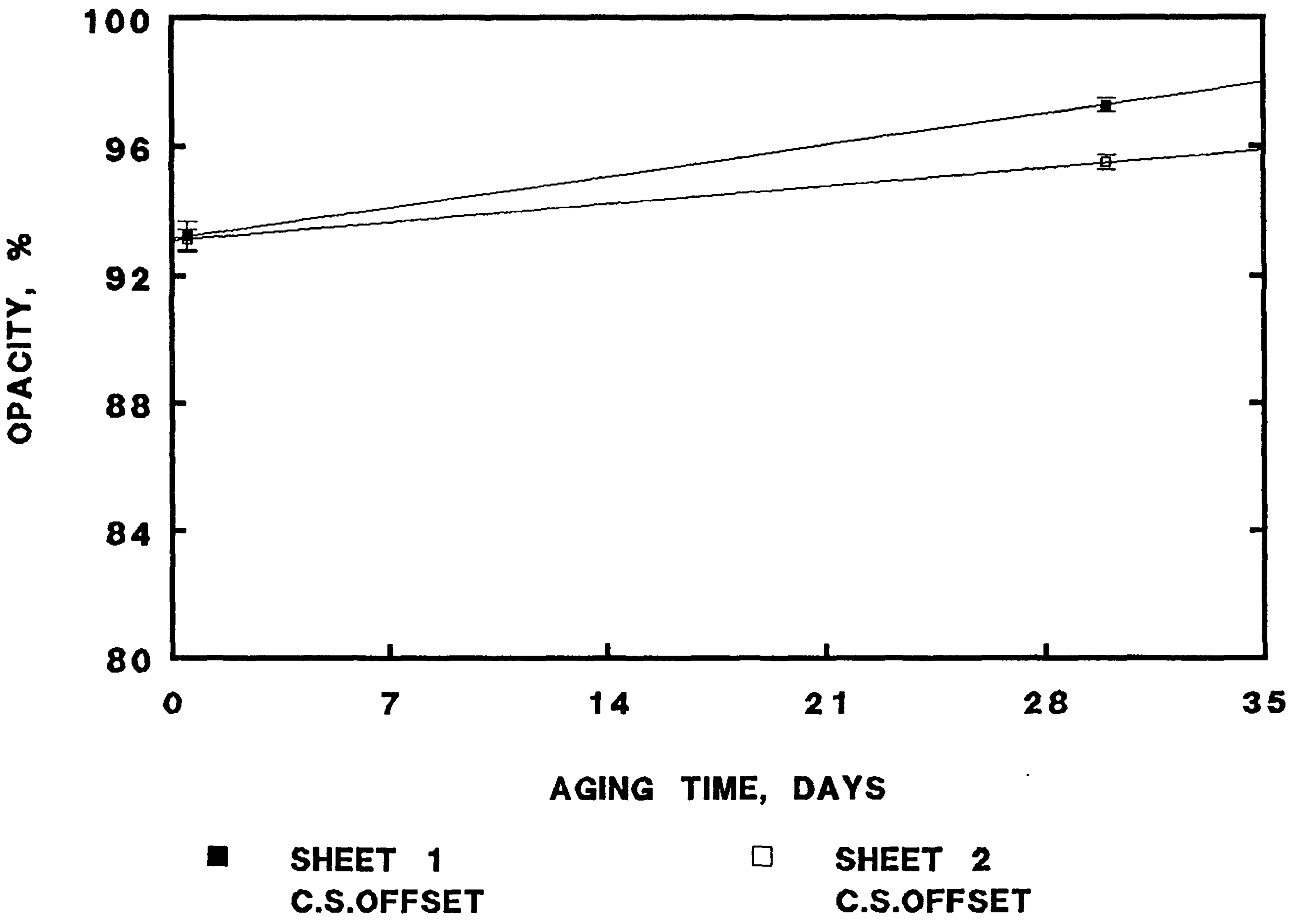
Aging Time: 30 days

Opacity, %

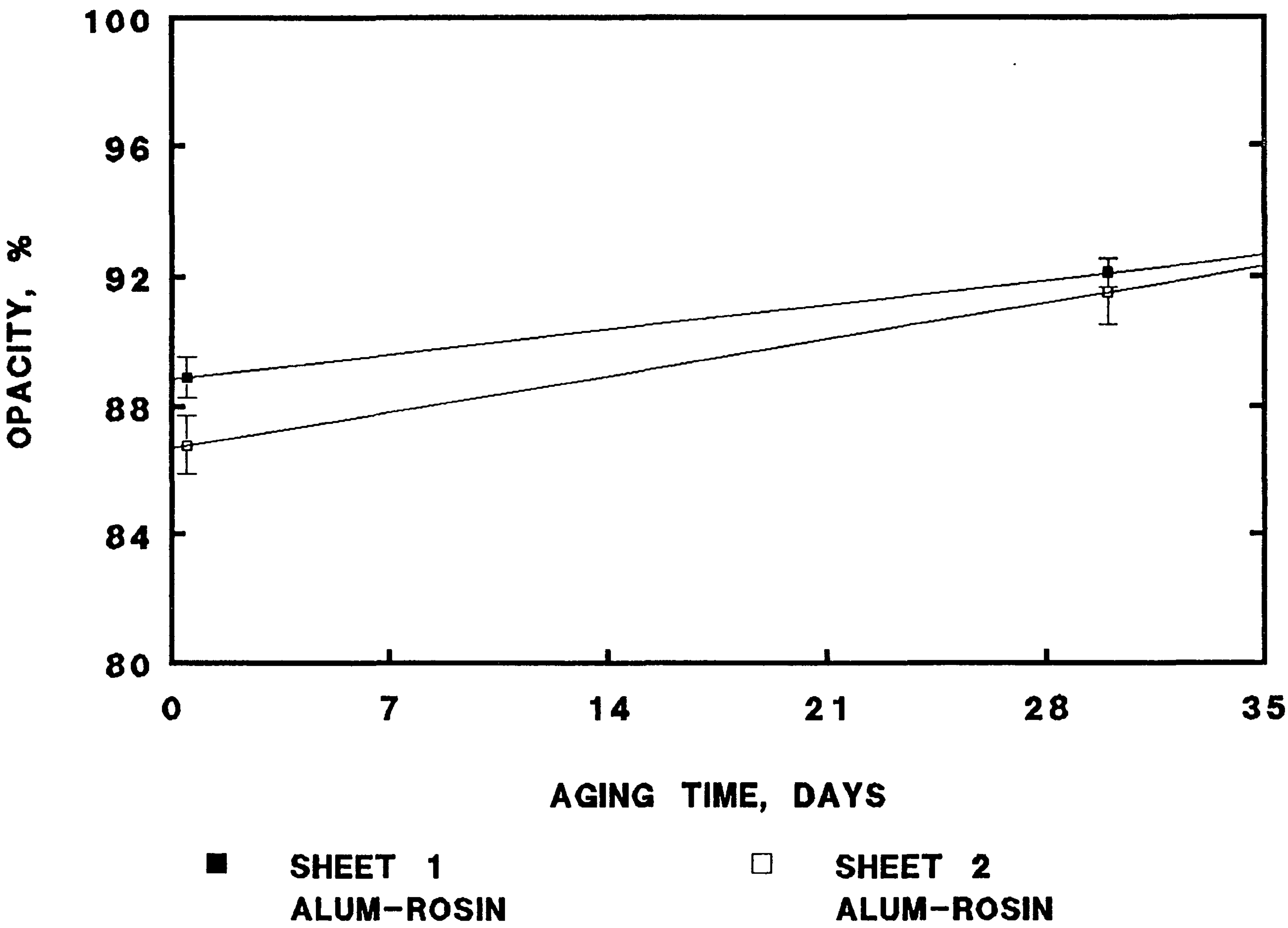
	BOOK PART LETTER K			BOOK PART LETTER M	
Sheet #	2	12		2	12
Tab Number			Tab Number		
1	96.7	96.5	1	91.8	92.1
2	96.5	96.8	2	91.3	92.8
3	96.5	96.7	3	91.3	92.3
4	96.8	96.4	4	93.2	92.3
5	96.3	96.7	5	91.6	92.1
6	96.2	97.0	6	92.6	90.8
7	96.1	96.6	7	93.6	91.1
8	96.4	96.8	8	92.6	90.2
9	96.2	96.6	9	92.3	91.7
Average	96.4	96.7	Average	92.3	91.7
Std. Dev.	0.237	0.179	Std. Dev	0.822	0.842

LIBRARY OF CONGRESS

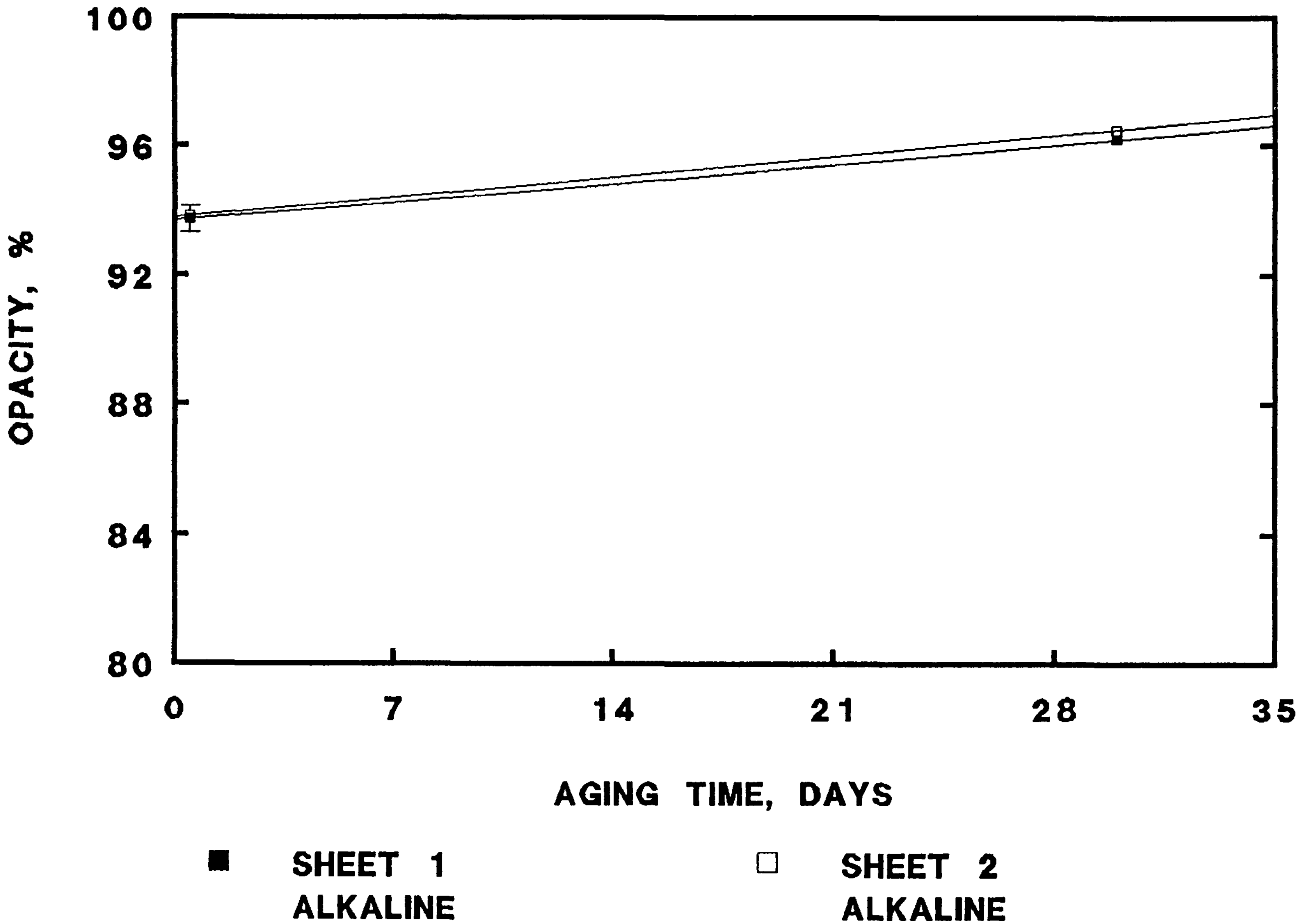
CONTROL NUMBER 303598



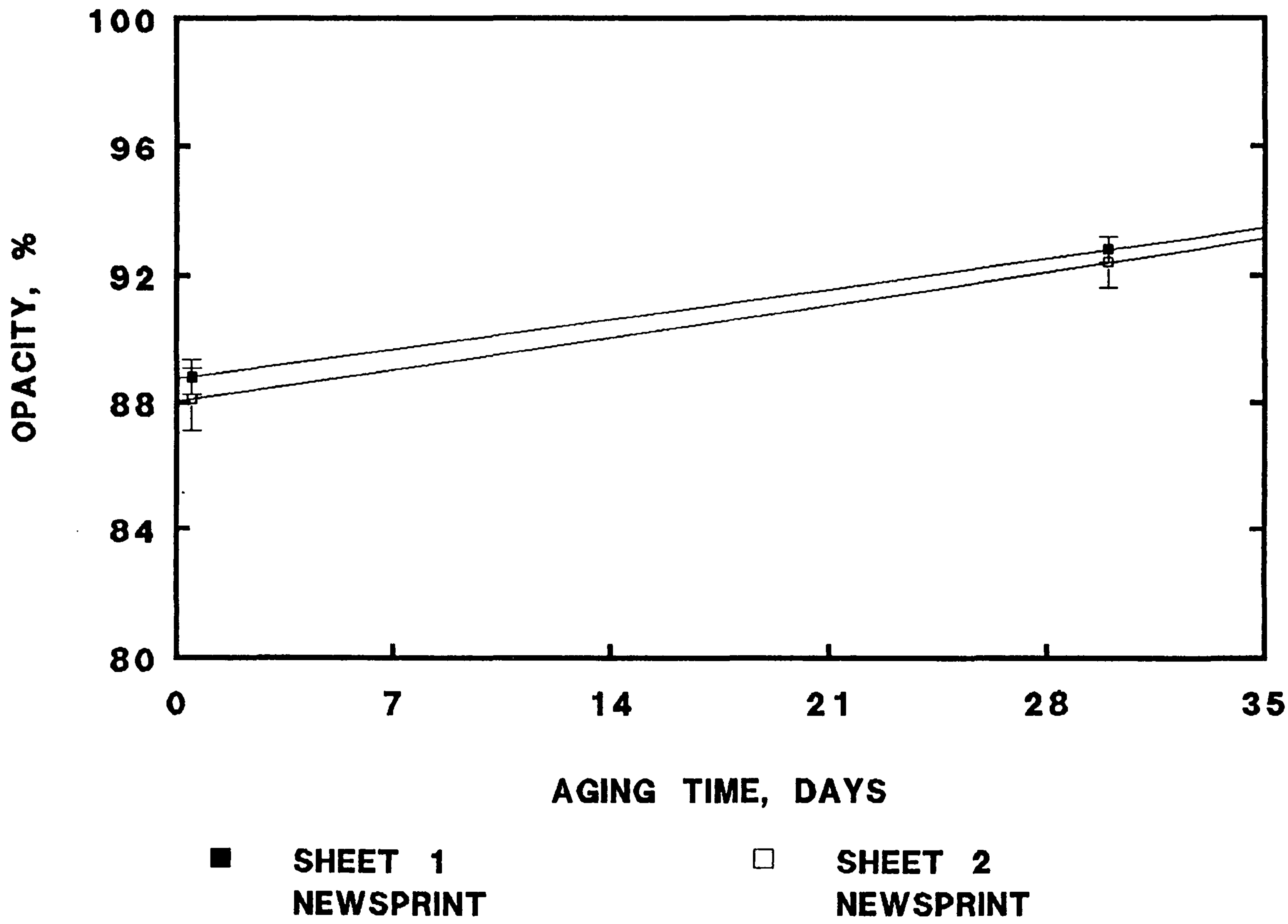
LIBRARY OF CONGRESS
CONTROL NUMBER 303598

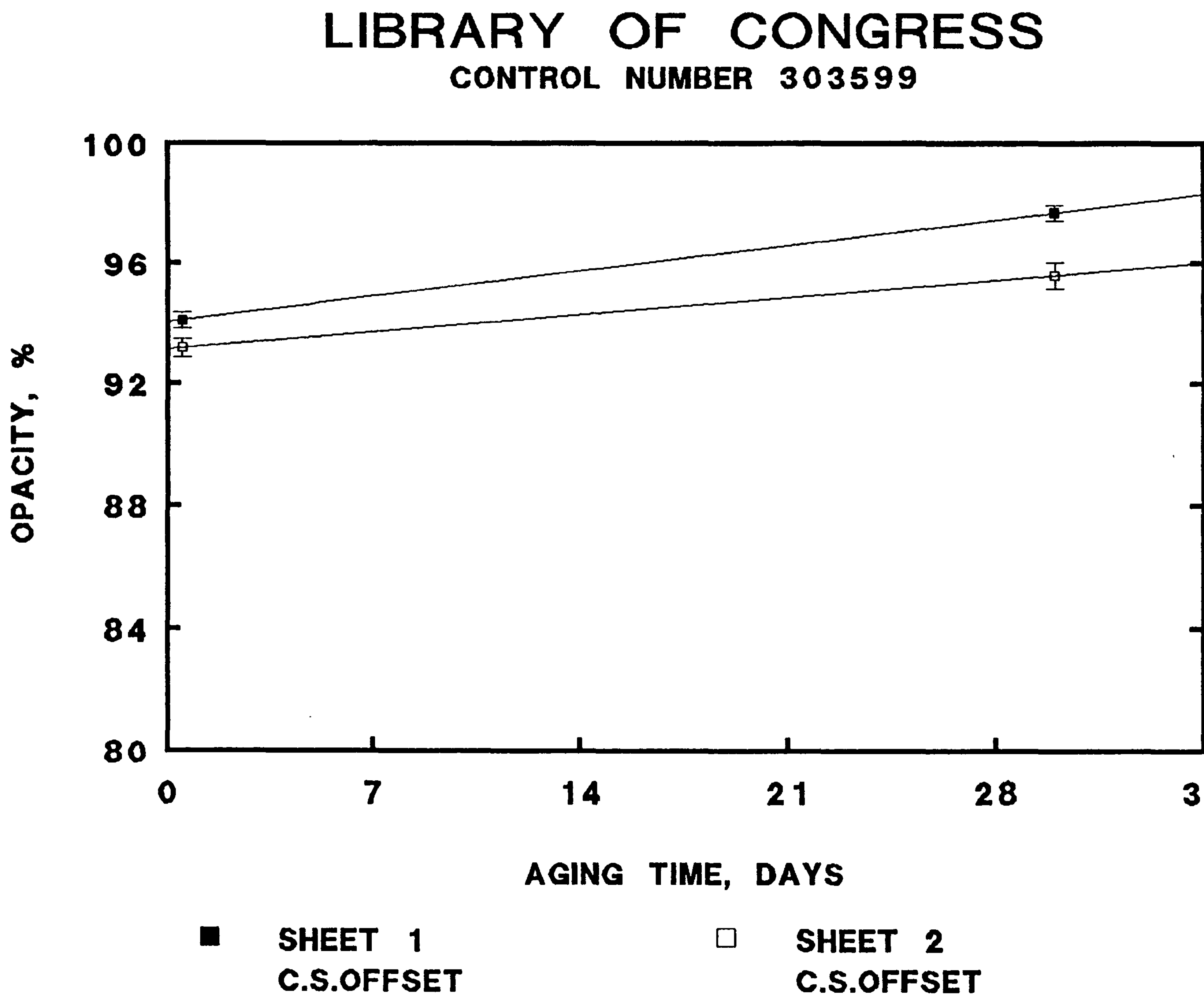


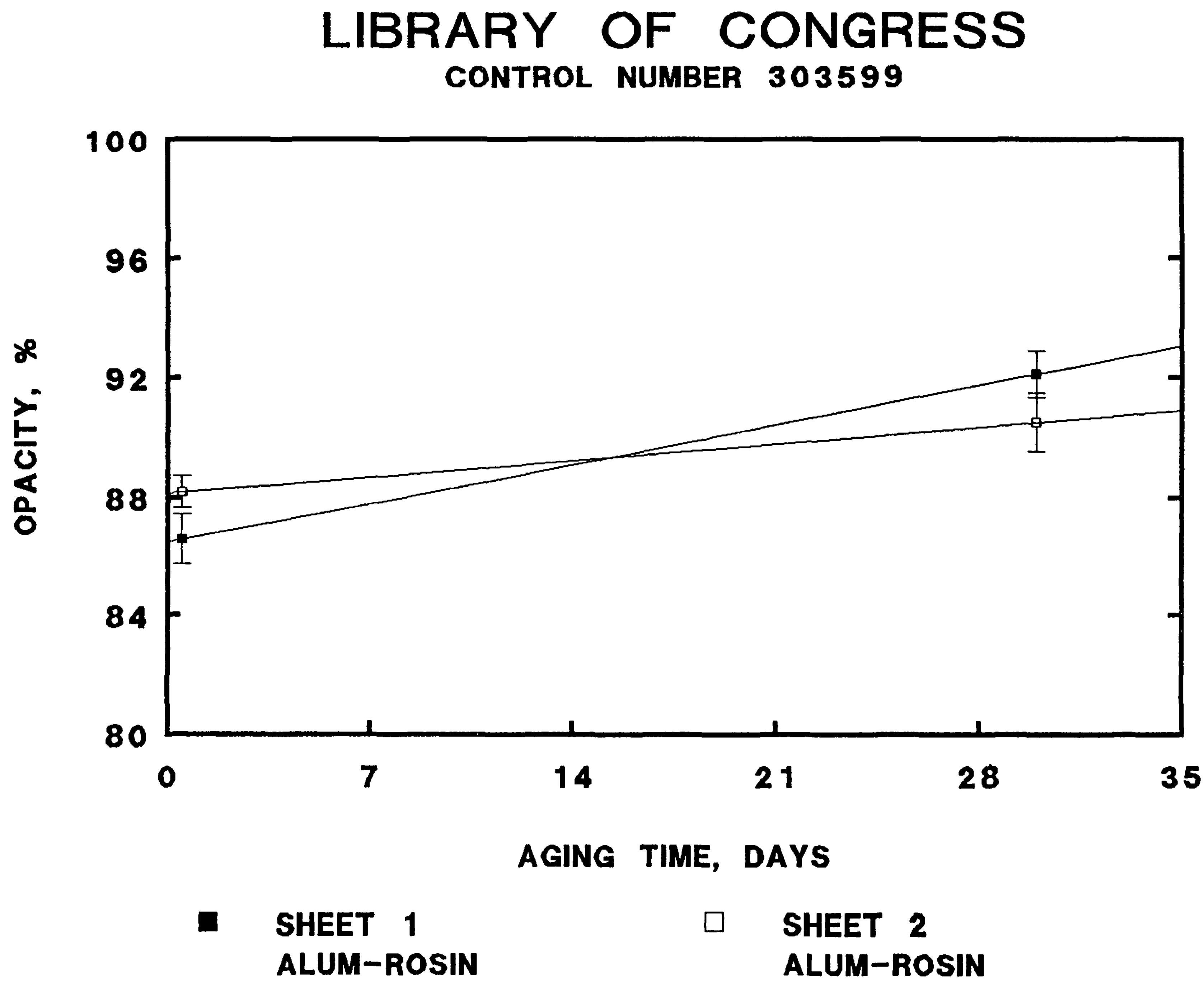
LIBRARY CONGRESS
CONTROL NUMBER 303598



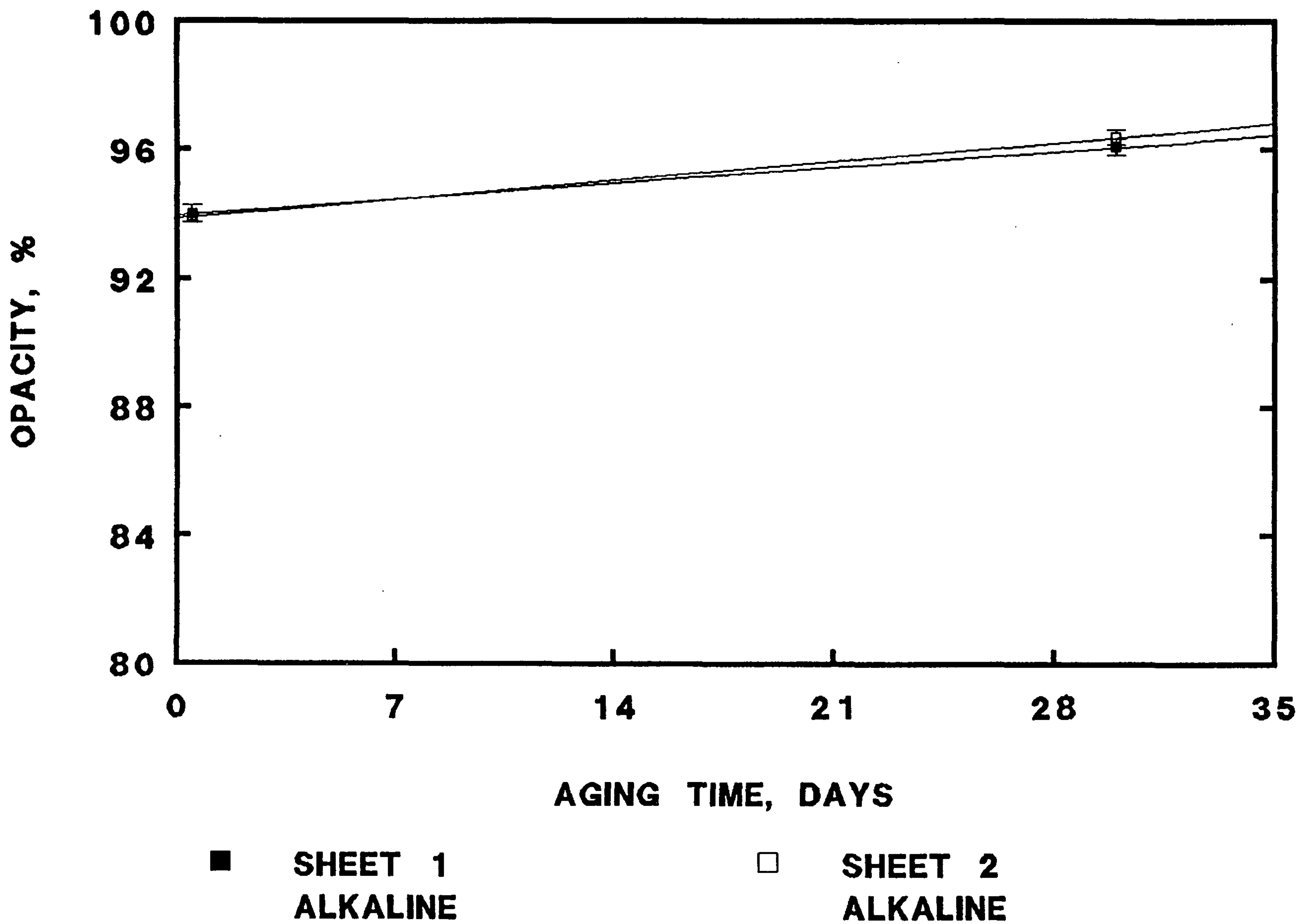
LIBRARY OF CONGRESS
CONTROL NUMBER 303598



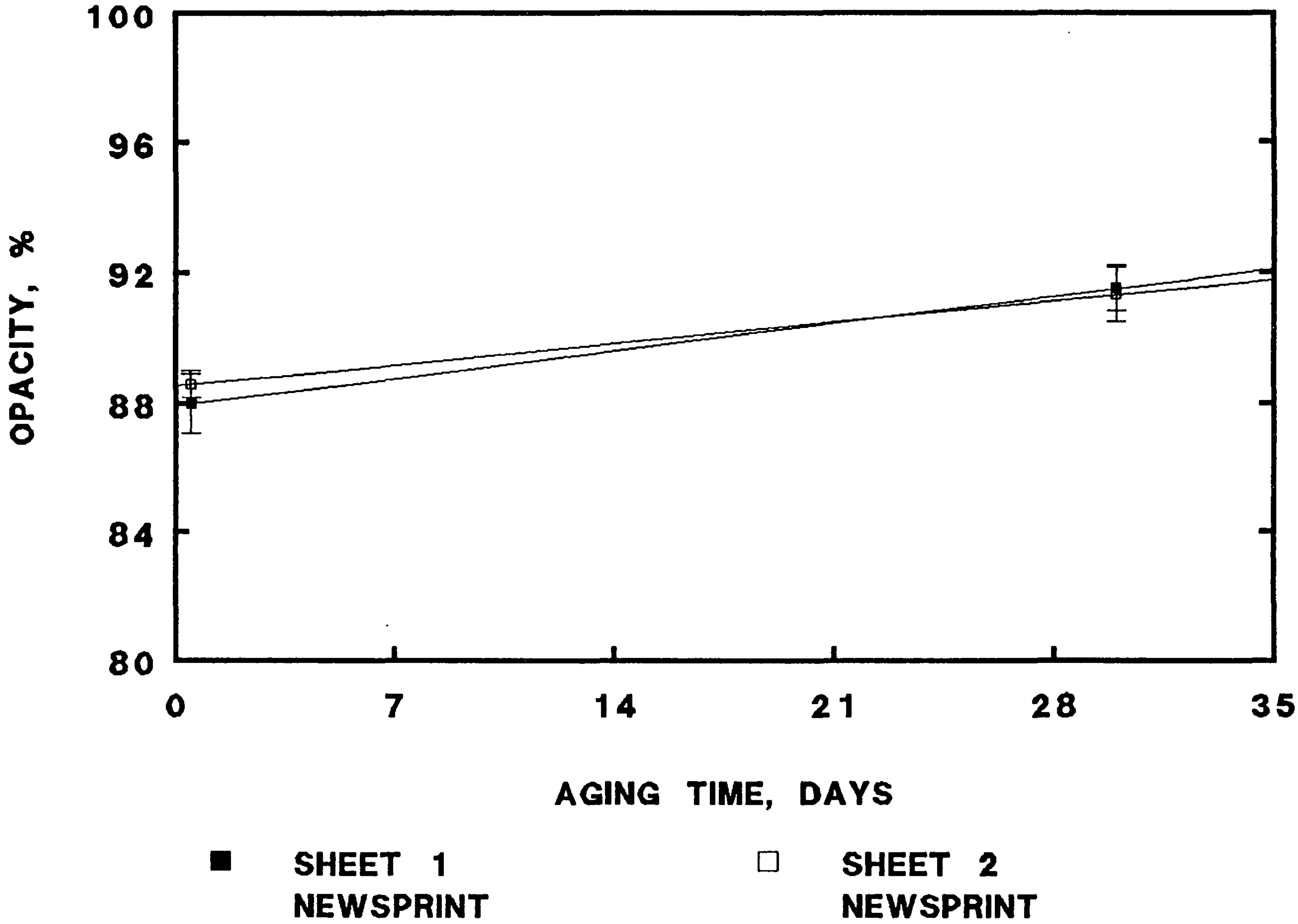

LIBRARY OF CONGRESS
CONTROL NUMBER 303599
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
C.S.OFFSET
SHEET 2
C.S.OFFSET


LIBRARY OF CONGRESS
CONTROL NUMBER 303599
OPACITY, %
100
96
92
88
84
80
0
7
14
21
28
35
AGING TIME, DAYS
SHEET 1
ALUM-ROSIN
SHEET 2
ALUM-ROSIN

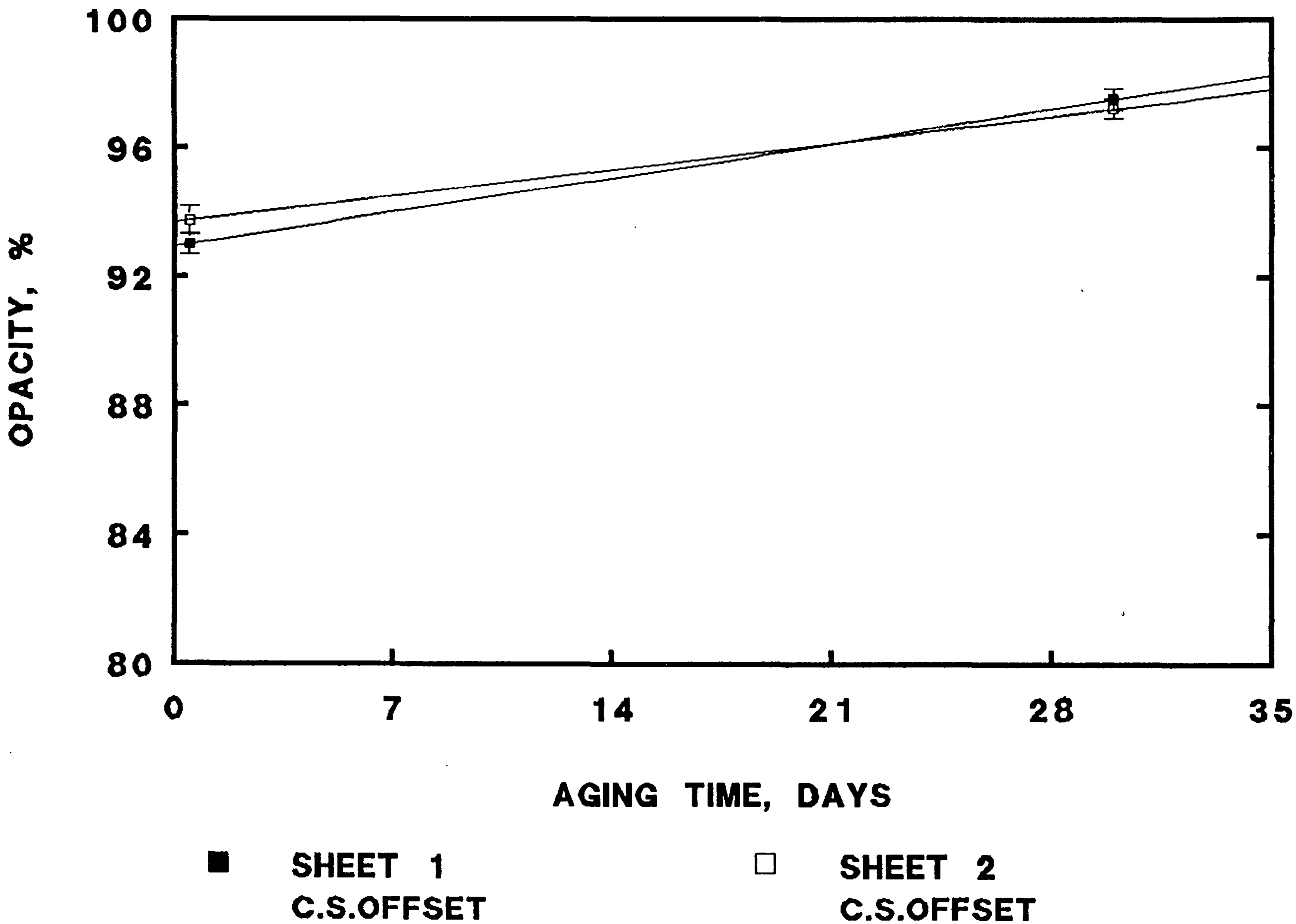
LIBRARY OF CONGRESS
CONTROL NUMBER 303599



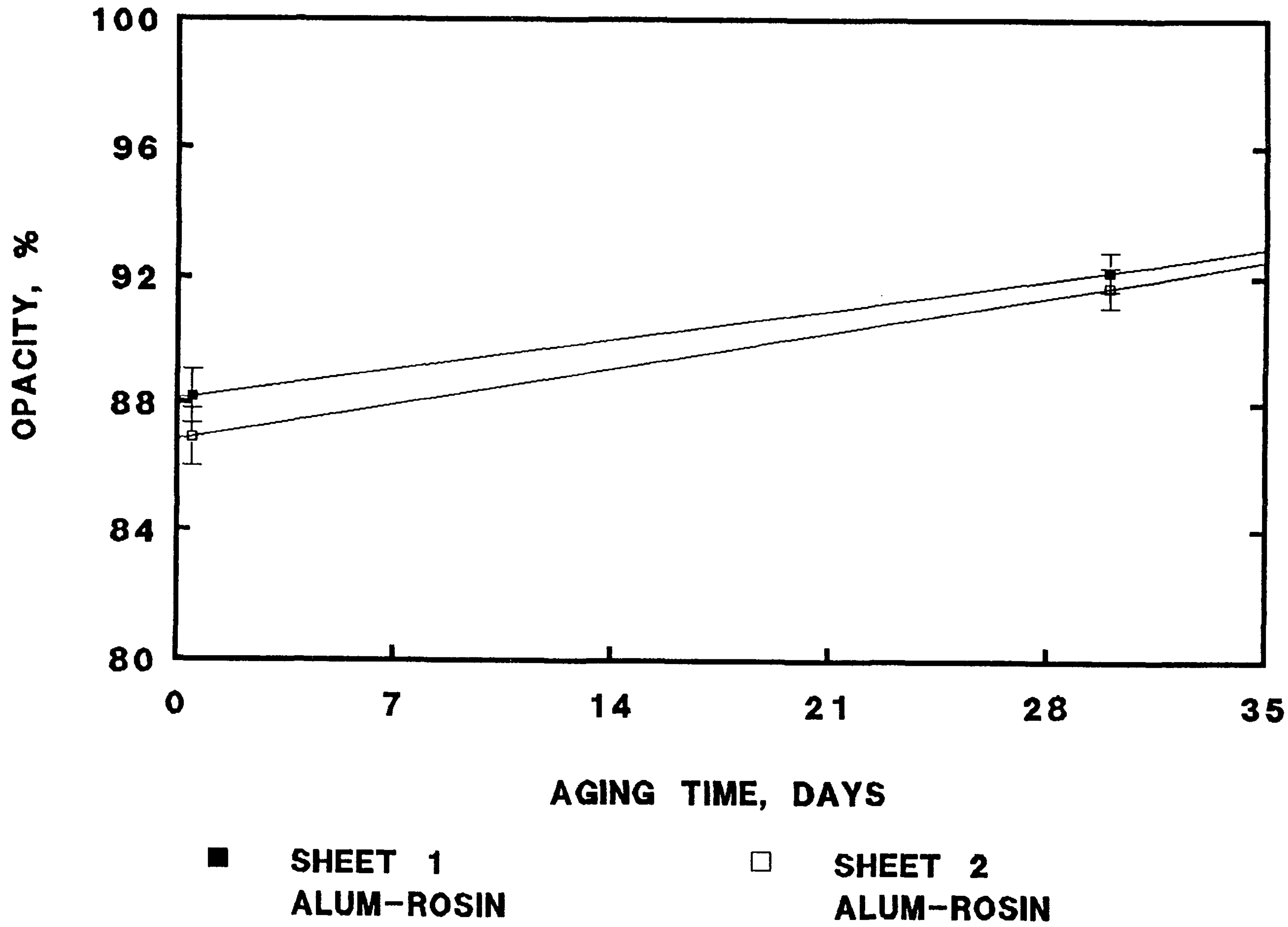
LIBRARY OF CONGRESS
CONTROL NUMBER 303599



LIBRARY OF CONGRESS
CONTROL NUMBER 303597

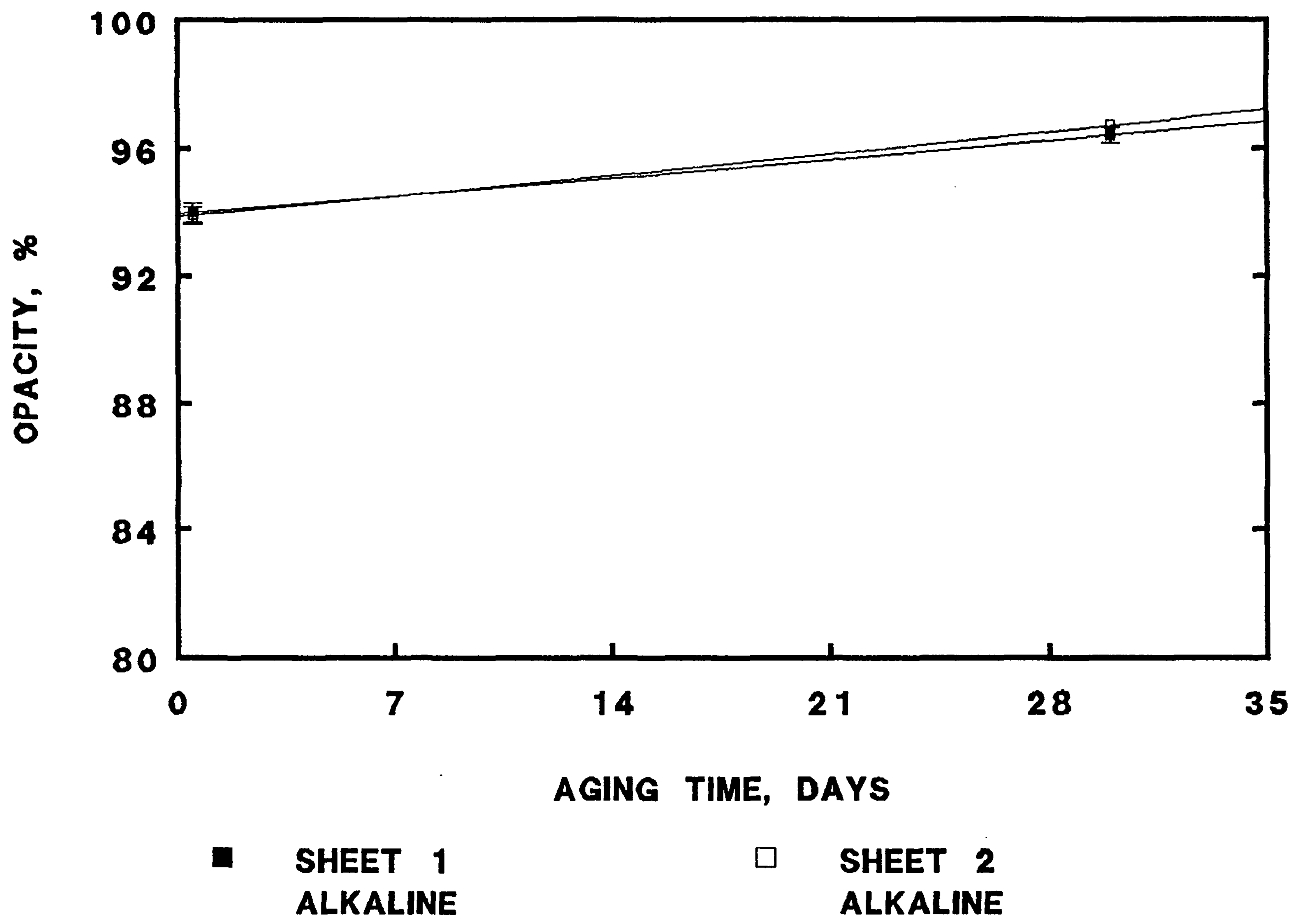


LIBRARY OF CONGRESS
CONTROL NUMBER 303597

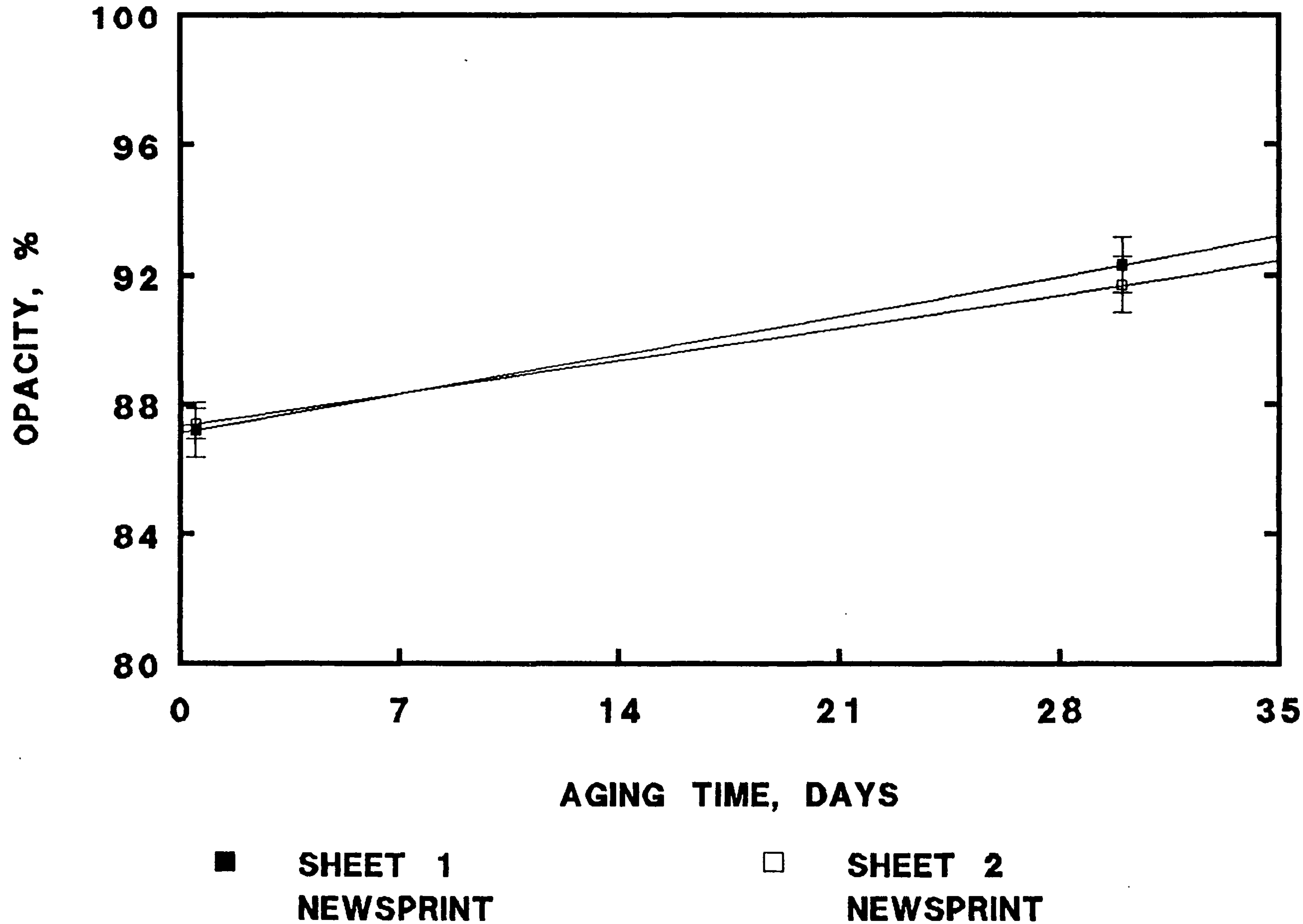


LIBRARY OF CONGRESS

CONTROL NUMBER 303597



LIBRARY OF CONGRESS
CONTROL NUMBER 303597



LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303596 Book Part Letter K

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	16.2	1	16.4
2	15.3	2	16.3
Average	15.8	Average	16.4
Aging Time:	3 days	Aging Time:	18 days
1	16.9	1	18.1
2	15.1	2	17.7
Average	16.0	Average	17.9
Aging Time:	6 days	Aging Time:	24 days
1	16.7	1	17.9
2	16.8	2	18.0
Average	16.8	Average	18.0
Aging Time:	9 days	Aging Time:	30 days
1	17.7	1	17.9
2	16.7	2	18.4
Average	17.2	Average	18.2

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303596 Book Part Letter H

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	18.4	1	19.1
2	16.8	2	18.0
Average	17.6	Average	18.6
Aging Time:	3 days	Aging Time:	18 days
1	17.1	1	20.6
2	16.5	2	21.0
Average	16.8	Average	20.8
Aging Time:	6 days	Aging Time:	24 days
1	19.2	1	21.4
2	17.5	2	21.5
Average	18.4	Average	21.5
Aging Time:	9 days	Aging Time:	30 days
1	19.9	1	22.3
2	18.8	2	23.0
Average	19.4	Average	22.7

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303596 Book Part Letter G

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	9.4	1	14.4
2	8.9	2	14.1
Average	9.2	Average	14.3
Aging Time:	3 days	Aging Time:	18 days
1	10.5	1	15.2
2	11.2	2	15.0
Average	10.9	Average	15.1
Aging Time:	6 days	Aging Time:	24 days
1	12.3	1	16.6
2	12.4	2	17.2
Average	12.4	Average	16.9
Aging Time:	9 days	Aging Time:	30 days
1	14.4	1	16.5
2	14.3	2	16.4
Average	14.4	Average	16.5

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number <u>303596</u> Book Part Letter <u>M</u>

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	6.5	1	13.5
2	7.8	2	12.9
Average	7.2	Average	13.2
Aging Time:	3 days	Aging Time:	18 days
1	9.6	1	13.9
2	9.8	2	14.5
Average	9.7	Average	14.2
Aging Time:	6 days	Aging Time:	24 days
1	12.5	1	14.6
2	12.3	2	18.4
Average	12.4	Average	16.5
Aging Time:	9 days	Aging Time:	30 days
1	13.4	1	16.3
2	10.6	2	17.8
Average	12.0	Average	17.1

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303595 Book Part Letter K

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	16.2	1	20.3
2	15.4	2	15.6
Average	15.8	Average	18.0
Aging Time:	3 days	Aging Time:	18 days
1	15.5	1	18.0
2	15.3	2	18.1
Average	15.4	Average	18.1
Aging Time:	6 days	Aging Time:	24 days
1	17.5	1	19.0
2	17.2	2	18.9
Average	17.4	Average	19.0
Aging Time:	9 days	Aging Time:	30 days
1	16.0	1	17.8
2	15.8	2	17.9
Average	15.9	Average	17.9

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303595 Book Part Letter H

Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	17.6	1	19.8
2	17.8	2	19.5
Average	17.7	Average	19.7
Aging Time:	3 days	Aging Time:	18 days
1	18.2	1	21.9
2	17.0	2	20.3
Average	17.6	Average	21.1
Aging Time:	6 days	Aging Time:	24 days
1	19.0	1	21.5
2	19.1	2	21.4
Average	19.1	Average	21.5
Aging Time:	9 days	Aging Time:	30 days
1	19.6	1	22.2
2	20.7	2	22.3
Average	20.2	Average	22.3

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303595 Book Part Letter G

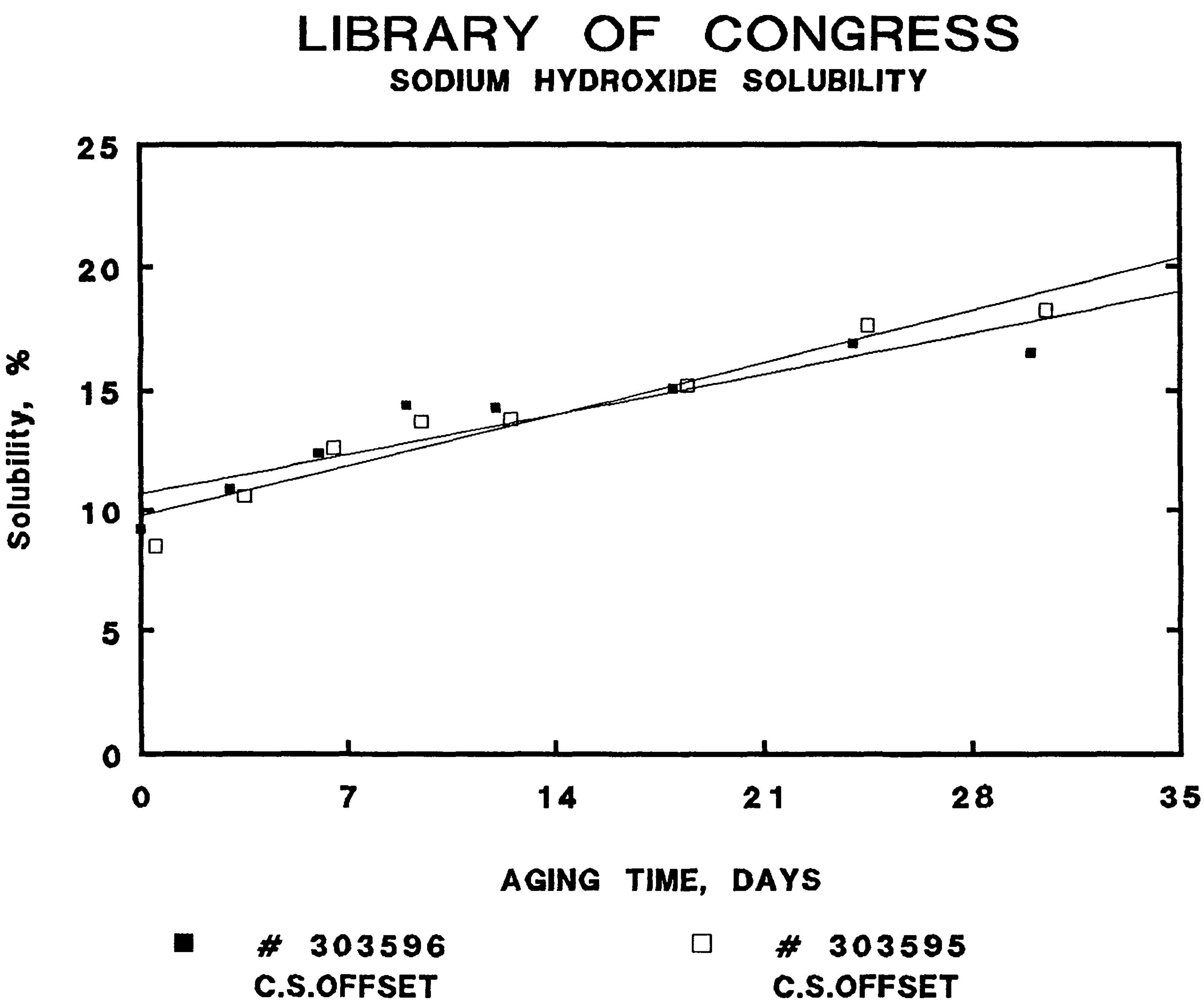
Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	8.6	1	14.2
2	8.4	2	13.4
Average	8.5	Average	13.8
Aging Time:	3 days	Aging Time:	18 days
1	10.8	1	15.2
2	10.4	2	15.2
Average	10.6	Average	15.2
Aging Time:	6 days	Aging Time:	24 days
1	12.4	1	17.6
2	12.7	2	17.6
Average	12.6	Average	17.6
Aging Time:	9 days	Aging Time:	30 days
1	13.8	1	17.9
2	13.5	2	18.4
Average	13.7	Average	18.2

LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY DATA

Control Number 303595 Book Part Letter M

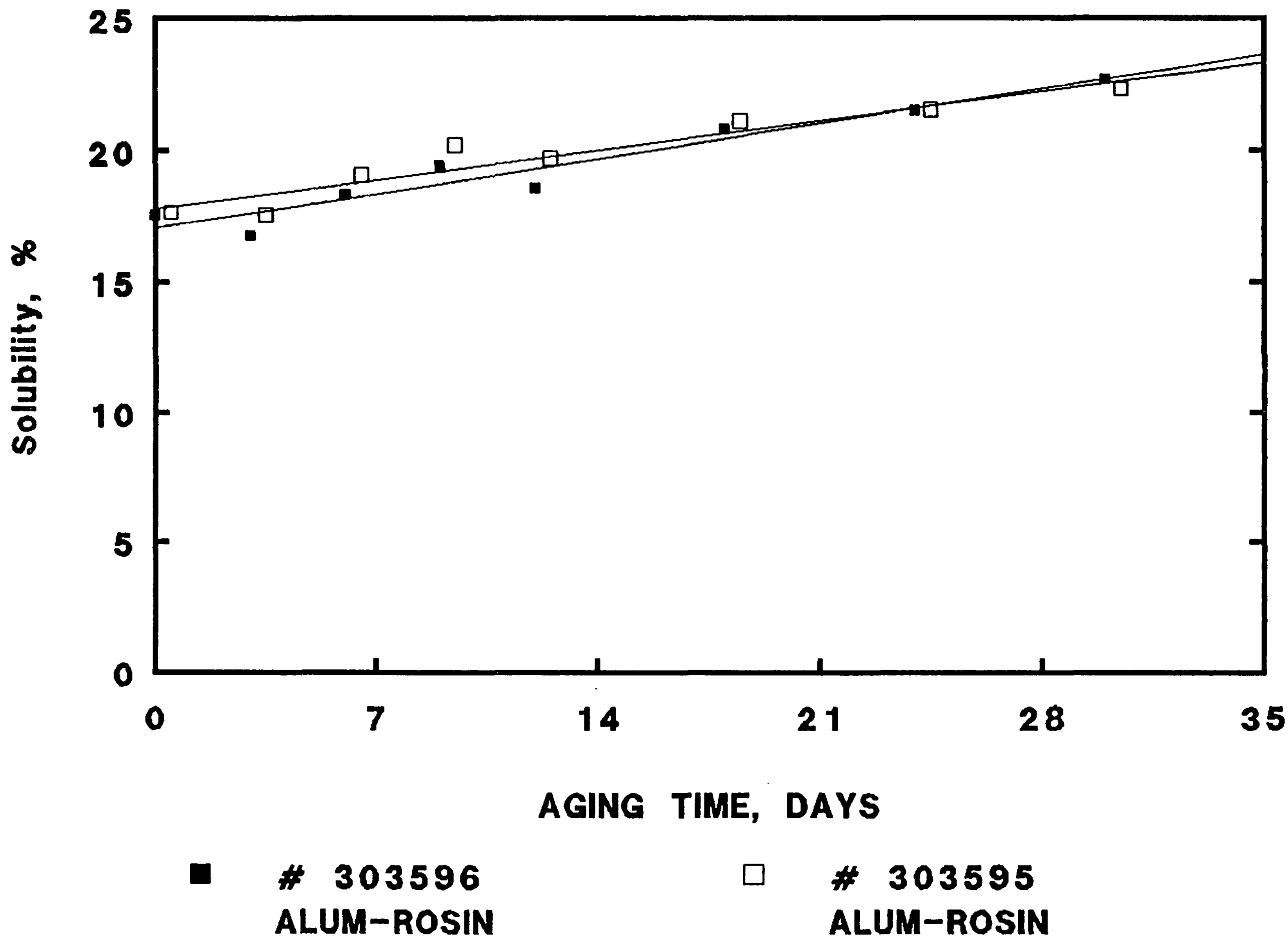
Test Number	Solubility %	Test Number	Solubility %
Aging Time:	0 days	Aging Time:	12 days
1	8.2	1	11.9
2	8.8	2	12.6
Average	8.5	Average	12.3
Aging Time:	3 days	Aging Time:	18 days
1	9.2	1	14.8
2	10.1	2	15.6
Average	9.7	Average	15.2
Aging Time:	6 days	Aging Time:	24 days
1	12.5	1	17.2
2	12.4	2	15.9
Average	12.5	Average	16.6
Aging Time:	9 days	Aging Time:	30 days
1	12.9	1	14.8
2	13.3	2	15.8
Average	13.1	Average	15.3



LIBRARY OF CONGRESS
SODIUM HYDROXIDE SOLUBILITY
Solubility, %
0
5
10
15
20
25
0
7
14
21
28
35
AGING TIME, DAYS
303596
C.S.OFFSET
303595
C.S.OFFSET

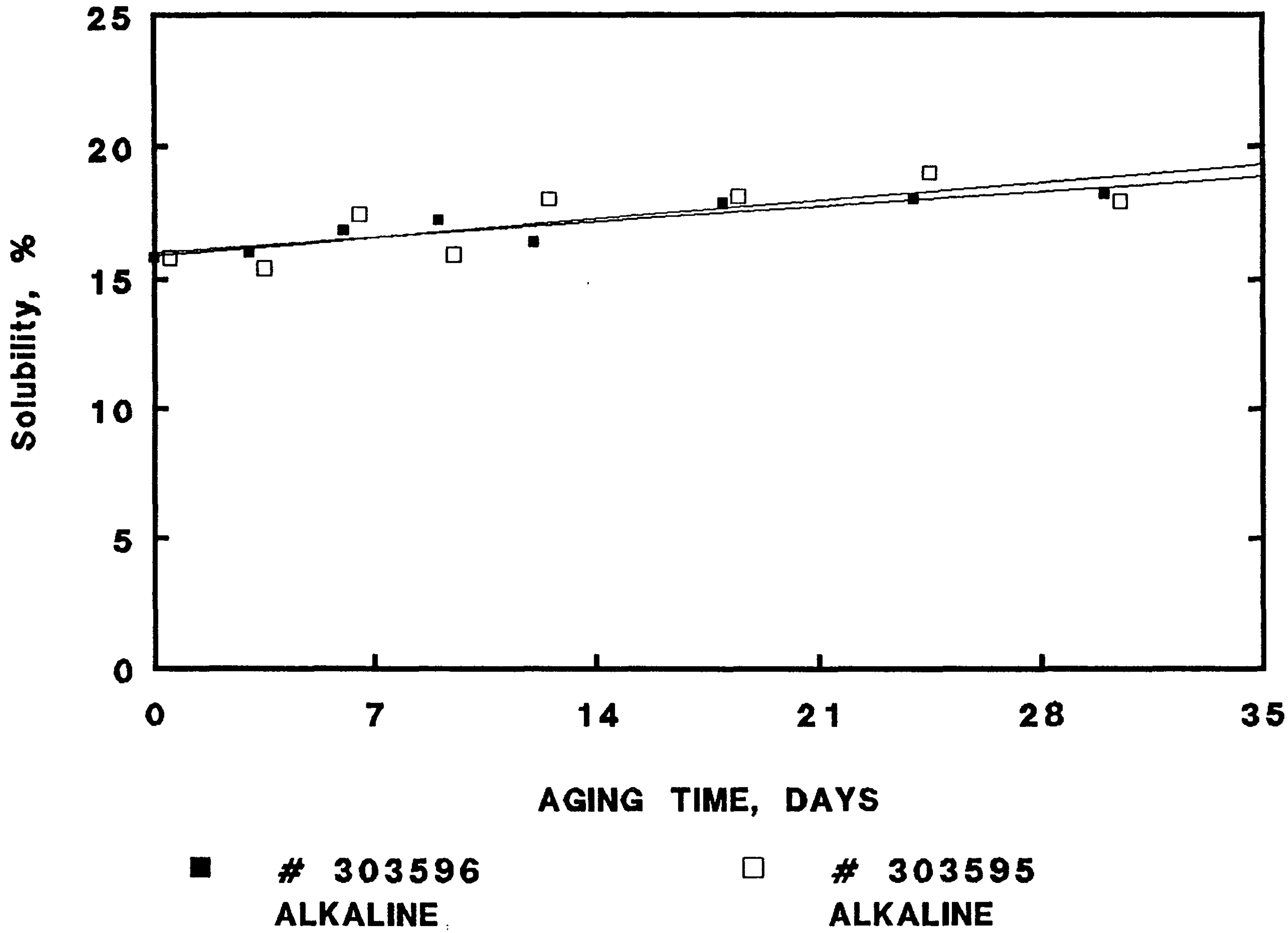
LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY



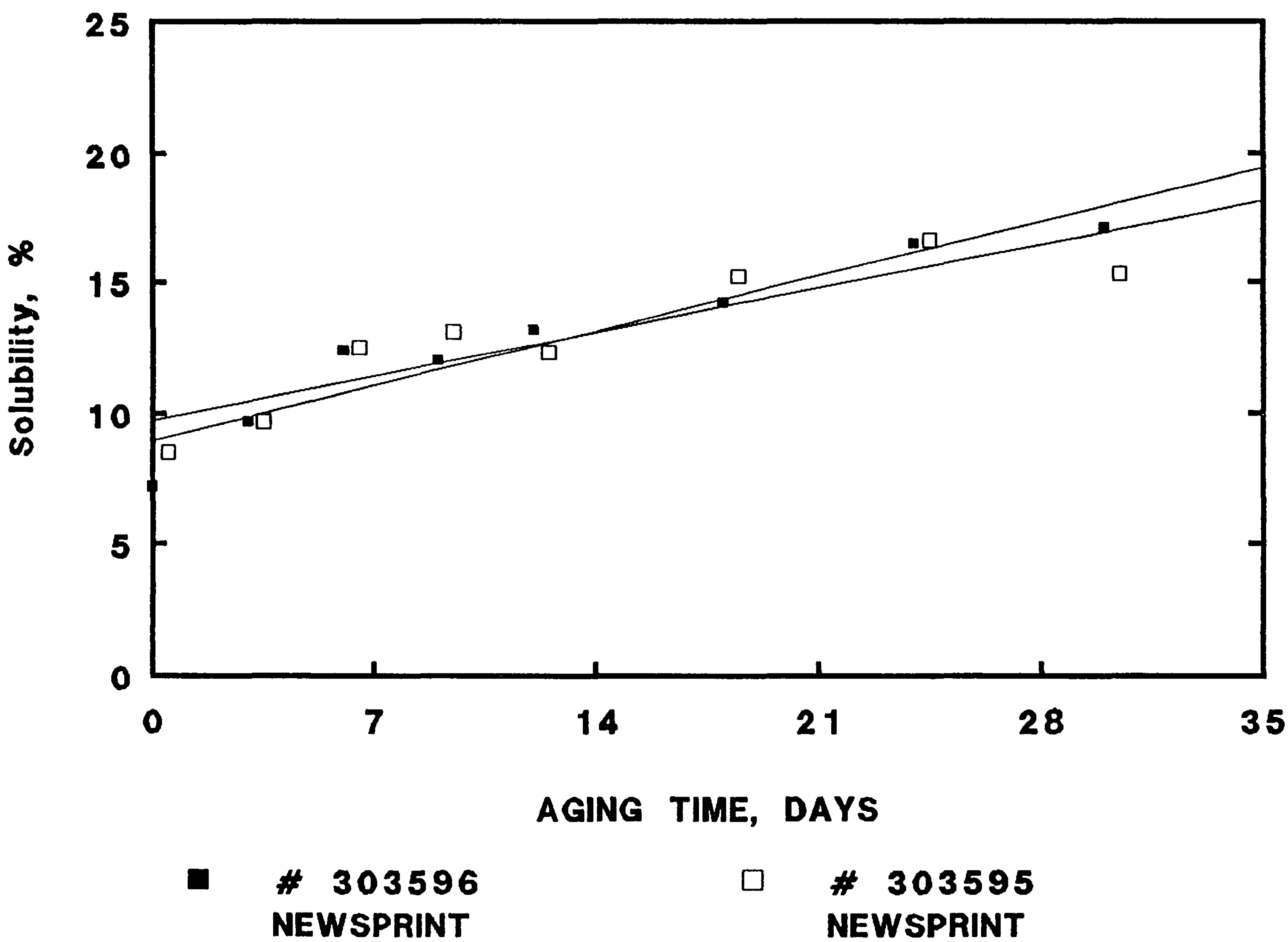
LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY



LIBRARY OF CONGRESS

SODIUM HYDROXIDE SOLUBILITY



LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number 303600 Book Part Letter G

Test Number	CaCO3, %	Test Number	CaCO3, %
Aging Time:	0 days	Aging Time:	12 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	3 days	Aging Time:	18 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	6 days	Aging Time:	24 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	9 days	Aging Time:	30 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1

LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number 303600 Book Part Letter H

Test Number	CaCO3, %	Test Number	CaCO3, %
Aging Time:	0 days	Aging Time:	12 days
1	0.2	1	<0.1
2	0.2	2	<0.1
Average	0.2	Average	<0.1
Aging Time:	3 days	Aging Time:	18 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	6 days	Aging Time:	24 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	9 days	Aging Time:	30 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1

LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number <u>303600</u> Book Part Letter <u>M</u>

Aging Time: 0 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 3 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 6 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 9 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 12 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 18 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 24 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 30 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number 303711 Book Part Letter G

Test Number	CaCO3, %
Aging Time:	0 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	3 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	6 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	9 days
1	<0.1
2	<0.1
Average	<0.1

Test Number	CaCO3, %
Aging Time:	12 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	18 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	24 days
1	<0.1
2	<0.1
Average	<0.1
Aging Time:	30 days
1	<0.1
2	<0.1
Average	<0.1

LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number 303711 Book Part Letter H

Test Number	$CaCO_3$, %	Test Number	$CaCO_3$, %
Aging Time:	0 days	Aging Time:	12 days
1	0.1	1	<0.1
2	0.2	2	<0.1
Average	0.2	Average	<0.1
Aging Time:	3 days	Aging Time:	18 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	6 days	Aging Time:	24 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1
Aging Time:	9 days	Aging Time:	30 days
1	<0.1	1	<0.1
2	<0.1	2	<0.1
Average	<0.1	Average	<0.1

LIBRARY OF CONGRESS

RETENTION OF ALKALINE RESERVE DATA

Control Number 303711 Book Part Letter M

Aging Time: 0 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 3 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 6 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 9 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 12 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 18 days

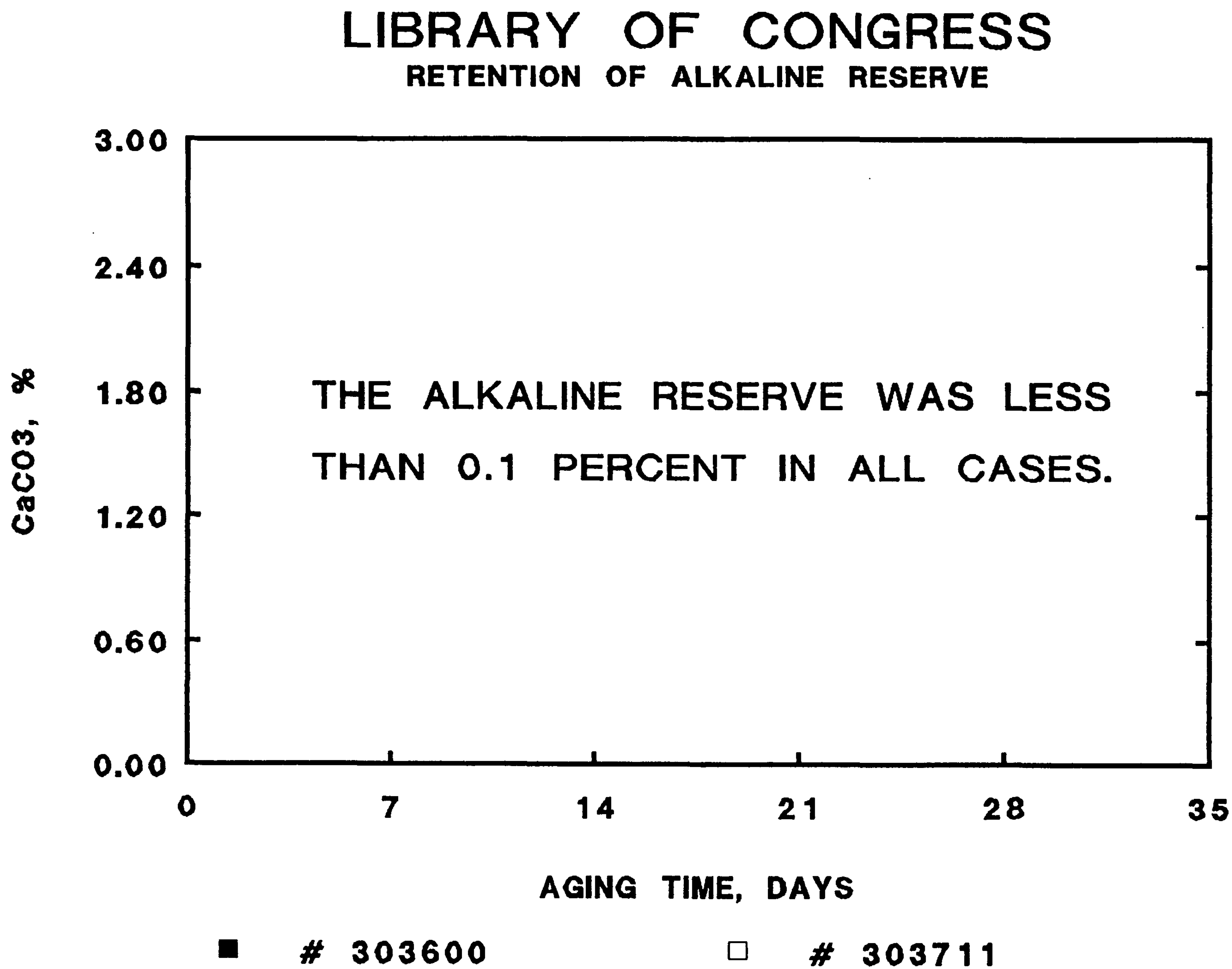
Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 24 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1

Aging Time: 30 days

Test Number	CaCO3, %
1	<0.1
2	<0.1
Average	<0.1


LIBRARY OF CONGRESS
RETENTION OF ALKALINE RESERVE
CaCO3, %
3.00
2.40
1.80
1.20
0.60
0.00
THE ALKALINE RESERVE WAS LESS THAN 0.1 PERCENT IN ALL CASES.
0
7
14
21
28
35
AGING TIME, DAYS
303600
303711

Institute of Paper Science and Technology

PHYSICAL PROPERTIES OF LIBRARY BOOKS

Untreated Control Books

Report To

THE LIBRARY OF CONGRESS
CONTRACTS & LOGISTICS SERVICES
1701 Brightseat Road
Landover, Maryland 20785

in response to

SOLICITATION NO. RFP90-32

June 10, 1991

Project 3717

Report 4

Atlanta, Georgia