13 December 1999

Date

Wiley Permission #

TO: William T. Dolling
Vice President, Science and Engineering

Thiokol Propulsion

P.O. Box 707

Brigham City, UT 84302

Wiley Manuscript

Page#/Figure#/Table#

I am preparing a manuscript to be published by John Wiley & Sons, Inc.:

Author/Tentative Title: George P. Sutton/Rocket Propulsion Elements

Estimated Publication Date: Summer 2000 Approximate Number of Pages: 600

I request your permission to include the following material in this and all subsequent editions of my book, including versions made by nonprofit organizations for use of blind or physically handicapped persons, and in all foreign-language translations and other derivative works published or prepared by John Wiley & Sons, Inc. or it licensees, for distribution throughout the world.

Author(s) and/or Editor(s):

Title of Book or Periodical:

Title of Selection: Copyright Date:

From Page: , line , beginning with the words

To Page: , line , ending with the words

Figure# on page Table # on page

(If necessary, attach continuation sheets.)

See attached figures 14-8a, 14-8b, 14-9, 14-10, 15-1, 15-3

Please indicate agreement by signing and returning the enclosed copy of this letter. In signing, you warrant that you are the sole owner of the rights granted and that your material doesn't not infringe upon the copyright or other rights of anyone. If you do no control these rights, I would appreciate your letting me know to whom I should apply.

Thank you,

s/G. Sutton

Name

George P. Sutton

11939 Gorham Ave. #302

Los Angeles, CA 90049

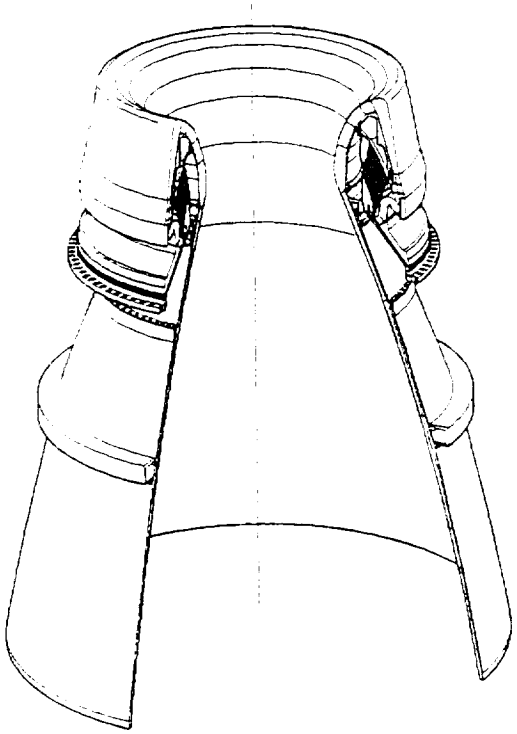
Requester's Return Address

AGREED & ACCEPTED

By: W. Dolling Vice President S&E Thiokol Propulsion 1/13/00

Signature *Title* *Date*

Credit and/or Copyright Notice



RSRM Nozzle Characteristics	
Type:	Contoured
TVC	Flexible Bearing
Expansion Ratio	7.72
Throat Diameter	53.86 in
Exit Diameter	149.64 in
Total Length	178.75 in
Weight	23,941 lb
Maximum Pressure	1,016 psi
Maximum Thrust	3,320,000 lbf
Materials	
Housings	Steel and Aluminum
Liners	Carbon Cloth Phenolic

Figure 14-8a RSRM Nozzle Configuration

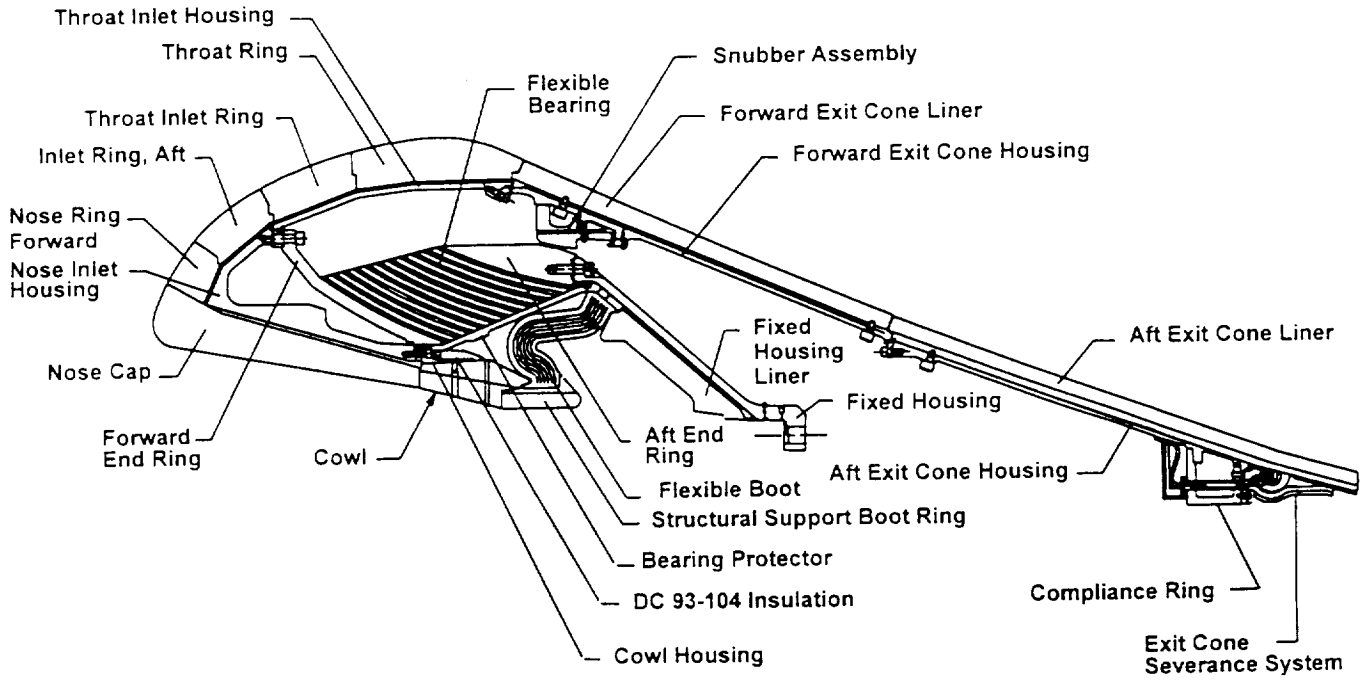


Figure 14-8b RSRM Nozzle Components

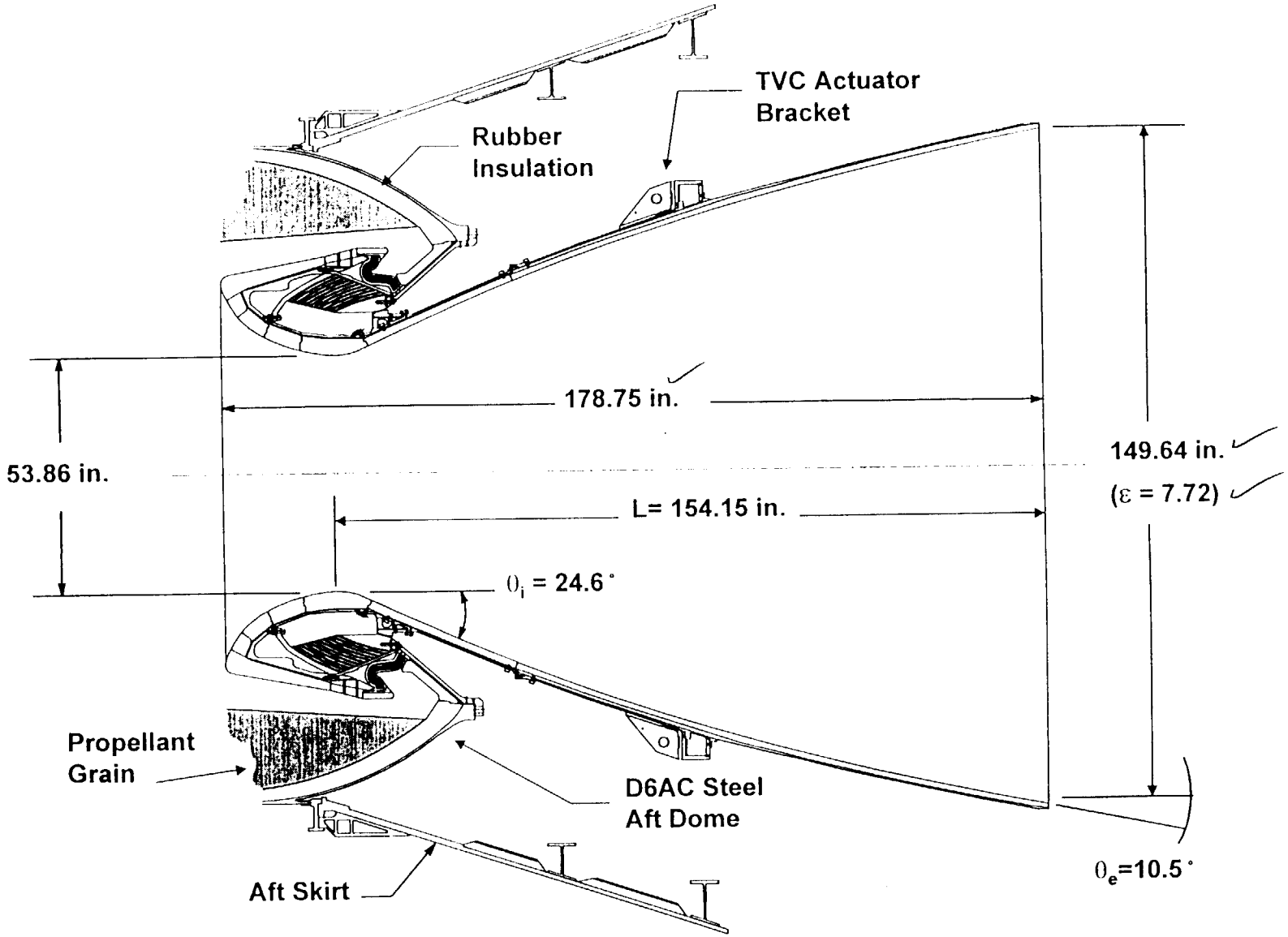


Figure 14-9 Key parameters which govern design of the nozzle contour

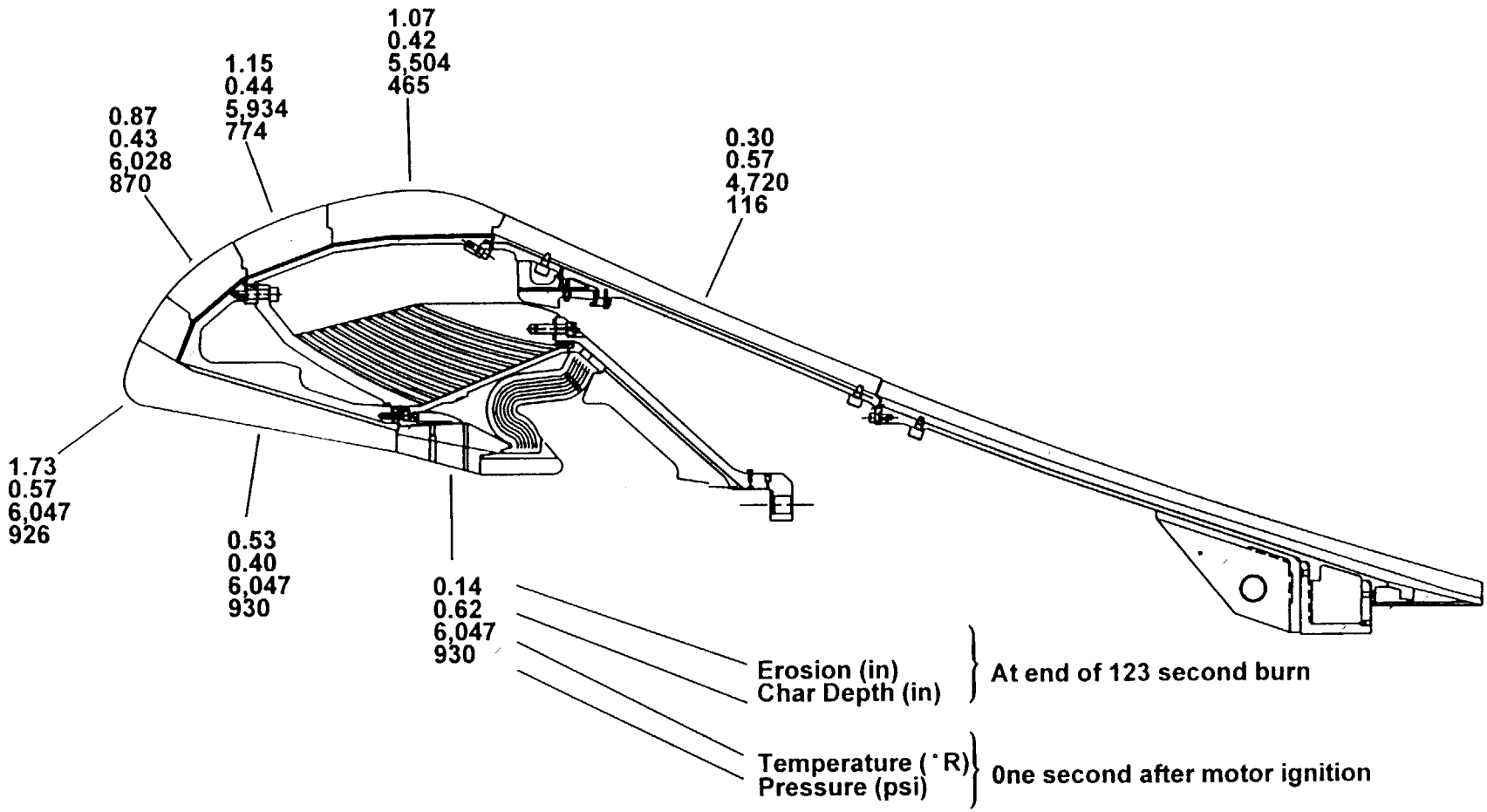


Figure 14-10 Temperature and erosion profiles for the RSRM nozzle

Figure 15-1

Large hybrid rocket booster concept capable of boosting the Space Shuttle. It has an inert fuel grain, a pressurized feed system, and can be throttled

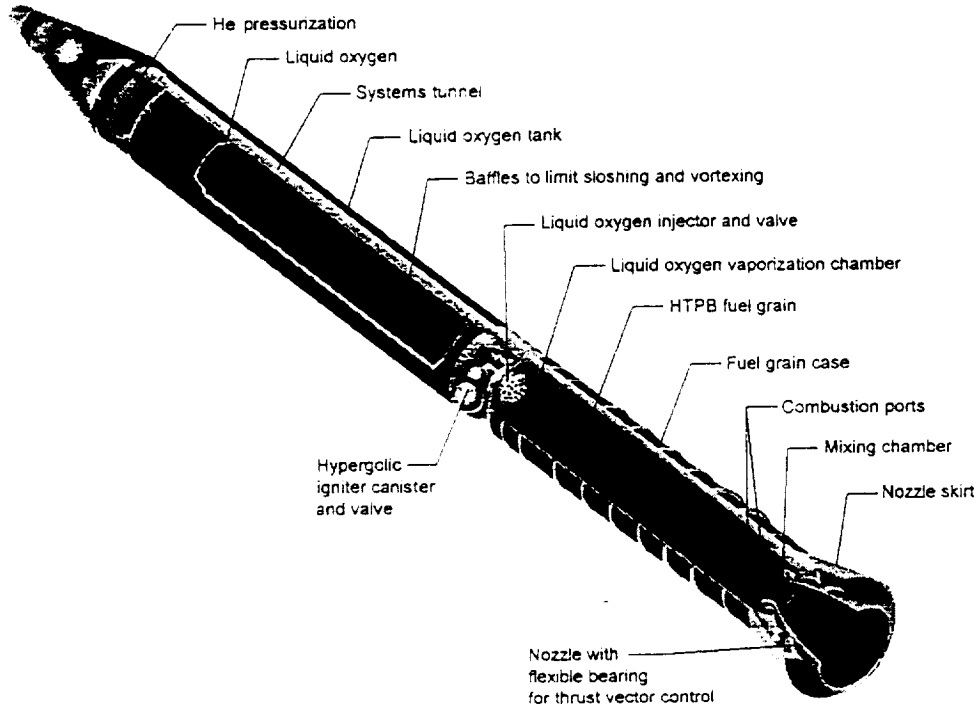
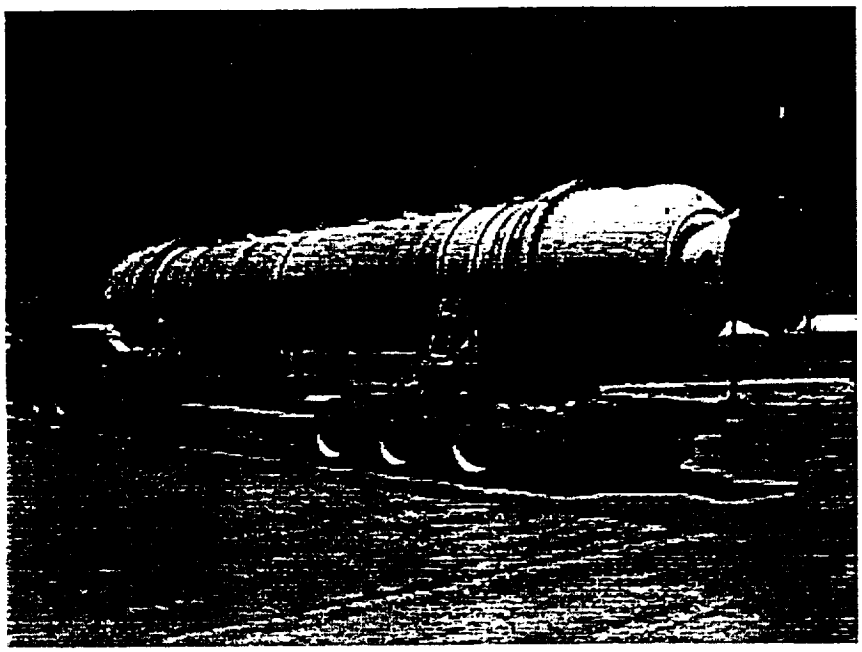


Figure 15-3

Static tests of a 250,000 lbf thrust hybrid motor prototype demonstrated additional work is needed to understand fuel regression and combustion stability issues at large scale.



(Photograph taken with digital camera – see enclosed black and white glossy print or diskette for electronic image.