

**MANUFACTURING EQUIPMENT
PURCHASE SPECIFICATION**

Nexteer Automotive

TITLE: CMM Program Purchasing Specification

NUMBER: SD-1019

ISSUED BY: Troy Rohn **DATE:** 11NO02

APPROVED BY:  030C12

REVISION: A **REVISION DATE:** 030C12

SHEET: 1 of 6

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I. INTRODUCTION

The purpose of this specification is to standardize program and documentation requirements for purchased 'Core' CMM programs such as programs that will be used in a production facility to determine conformance to specifications. This will allow the CMM programs to be usable in the CMM Global Library. The CMM Program will be installed and evaluated on a Nexteer Automotive CMM prior to acceptance. All program documentation must be written in English.

II. PURCHASE SPECIFICATION REQUIREMENTS

A. PROGRAMMING SOFTWARE AND HARDWARE

1. All CMM programs must be written utilizing a scanning probe.
2. Zeiss CMM programs must be written in Calypso.
Note: The software versions will be agreed upon during the feasibility review
3. A rotary table should be utilized when the part has an axis of rotation. This will be determined during the feasibility review.

B. FIXURING DOCUMENTATION

1. For custom-made fixtures, the fixture design must be provided utilizing the Nexteer Drawing Standard SD003, General Drawing and Manuals Specification.
2. Catalog information for standard fixture components must be provided.
3. Photos of the fixture components must be provided including documentation describing the proper setup and alignment of the fixture.

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C. CONFIGURATION DOCUMENTATION

1. For all configurations, photographs with written descriptions must be provided.
2. Catalog information for standard probes, cubes and extensions must be provided. This must include probe tip diameter, material, length, stem diameter and thread size.
3. For custom-made probes, documentation (drawings, descriptions, etc.) of the probes must be provided.
4. For all Zeiss configurations, Zeiss plates must be used.
5. Provide 1 set of probe configuration if required by feasibility review.
6. A probe calibration program must be provided. This program must print out the calibration results after the completion of the calibration. Printout should include the calibration sphere identification number.

D. PROGRAM NAMING CONVENTION

1. CMM Program File Naming Convention:

Example: T1-10T_Rack_28180797_008S_OP40_Green Teeth_03DE10 (_=space)

T1-10T: Model

Rack: Part Name, use a shortened name for the part

28180797_008S: Part Number +Rev Level, 8 numbers for the part number and 3 numbers and 1 letter for revision

OP40: Operation number, 4 to 5 characters including "OP", "OP" contains the letter O, OP999 is for a supplied part, "OP_" is for unknown

Green Teeth: Description

03DE10: Date, 6 characters Day, Month, Year are always 2 digits long. If number is less than 10, then it begins with a zero

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E. PROGRAM REQUIREMENTS

1. Road mapping to be used whenever specified on part print.
2. Program output must also contain x,y,z results for positional measurements
3. Calypso standard filtering methods to be used unless otherwise specified at the feasibility review. Any non standard filtering method must be approved by Nexteer.
4. Calypso standard outlier elimination (3X Std. Dev.) to be used unless otherwise specified at the feasibility review.
5. Type of circle measurement must be agreed to at the feasibility meeting. Best Fit, Max Inscribed, Min Circumscribed or other method.
6. If the rotary table is utilized in the program, a rotary table party alignment must be included within the program.
7. Scanning and self-centering should be used whenever possible or as determined by the feasibility meeting.

F. REPEATBILITY AND REPRODUCIBILITY STUDIES

1. The CMM program supplier must perform an R&R study at their facility on parts provided by the Nexteer Engineer. The R&R study will be conducted as defined by the AIAG Measuring Systems Analysis (MSA) manual.
2. The R&R should be run using a SPC statistical program.
3. The R&R must be performed using at a minimum, 5 parts, 2 operators and 3 trials, unless otherwise specified.
4. The overall Gage R&R result must be less than 10%. If the Gage R&R is greater than 10%, the Engineer must approve.
5. The CMM program supplier must recheck key features by another inspection method. These key features will be indentified during the feasibility meeting. Documentation of this comparison must be provided to Nexteer.
6. Save one R&R part and data for correlation study between supplied CMM and Nexteer CMM.

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Note: The above specification was developed without considering whether patents may or may not be involved. In all cases, therefore, the supplier shall be required to assume patent liability

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G. INSTALLATION AND DEBUG

1. The CMM program supplier must install the CMM program on a Nexteer CMM and repeat the Gage R&R study that was completed at the supplier.

H. PROGRAM ACCEPTANCE

1. The CMM Program will be accepted after the completion of the following items:
 - a) Acceptable R&R results run at Nexteer. This is a repeat of the R&R study that was completed at the supplier.
 - b) Acceptable correlation results on the reference R&R part between CMM and Nexteer's CMM. This should not exceed 10% of the feature.

III. SPECIFICATION REVISIONS

Page #	Rev Symbol	Revision Description	Date	Issued By
All	A	Procedure rewritten	03OC12	David Byers