

1.0 SCOPE

- 1.1 **Purpose:** This specification pertains to the standardization of tool holders—basic for numerically controlled machine tools. The requirements contained herein are intended to provide a high degree of tool holder interchangeability between machine tools of various types within the same classification in terms of size, torque, RPM, accuracy, etc.
- 1.2 **Classification:** This specification covers tool holder—basic standards applicable to all types of numerically controlled machine tools. Loading and exchange of these tool holders may be accomplished by either manual or mechanical means. Tool holders are assigned to classification series in terms of the basic geometric shape that joins the machine tool. Established tool holder series are listed herein under 4.2.
- 1.3 **Revision and Amendment**
- 1.3.1 As warranted, the classification, scope, and related portions of this specification may be expanded to provide additional tool holder—basic series.
- 1.3.2 As warranted, this specification may be modified to provide for “state of the art” development.

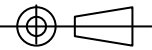
2.0 APPLICABLE SPECIFICATIONS

This specification has direct correlation to NAS900 series specifications for numerically controlled machine tools.

3.0 GLOSSARY OF TERMS

Terms relevant to this specification and the application of same are as follows:

- 3.1 **Spindle:** A component assembly of the machine tool, the function of which is to accept the “Tool Holder—Basic”, locate, center, retain, and drive it.
- 3.2 **Non—Rotating Socket:** A receptacle that is fixed in regard to its mounting on the machine tool, the function of which is to accept the “Tool Holder—Basic”, locate, align, and retain it.
- 3.3 **Tool Holder—Basic:** The unit that fits directly into the “Spindle” or “Non—Rotating Socket” of the machine and holds the “Tool” or tool adapter.
- 3.4 **Tool:** A device retained by the “Tool Holder—Basic” or tool adapter and contacts the workpiece for the purpose of material removal, marking, forming, etc...
- 3.5 **Tool Adapter:** The device which accepts the “Tool” and which in turn, fits into the “Tool Holder Basic”. Such a device is not used in all cases. When it is used, its function is to center, establish angular position when necessary, provide for axial retention when required, and drive the “Tool”. Representative forms to receive the tool are: Collet, a cylindrical bushing, a screw thread, or a tapered surface.
- 3.6 **Integral Tool:** Describes the condition where the “Tool” is integral with the “Tool Holder—Basic”. This is a one piece arrangement with regard to the shank. The shank end will be a duplicate of the “Tool Holder—Basic” in all respects, and will meet all requirements except for any modification with regard to the specific “Tool” involved.
- 3.7 **Tool Set—up:** Describes an “Integral Tool” or a combination of a “Tool”, “Tool Holder—Basic” and necessary “Adapters” to form a fixed unit to achieve the desired tool to “Spindle” or “Non—Rotating Socket” relationship.

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- 3.8 Tool Preset: The capability to assemble and fix the "Tool Set—up" off—line, to pre—established length and diametric requirements.
- 3.9 Positive Drive: The provision for the positive angular relationship between "Spindle" or "Non—Rotating Socket" and "Tool Holder—Basic" under full rated torque loading. This term and its provisions may also be applied to the mating features of the "Tool Set—up" components.
- 3.10 Positive Axial Retention: The provision for retaining the Tool Holder—Basic in the "Spindle" or "Non—Rotating Socket" against the gauging and indexing provision with sufficient positive axial force to exceed the external cutting or work performance reactions.
- 3.11 Pull Stud: A device that may be inserted into the end of the "Tool Holder—Basic" for positive retention and/or end stop purposes.
- 3.12 Tool Angular Orientation: The "Tool Holder—Basic" shall have a mechanical feature to position retain the "Too Holder—Basic" in a specific angular relationship with regard to the "Spindle" or "Non—Rotating Socket".
- 3.13 Automatic Insertion and Removal Provision: The "Tool Holder—Basic" shall, when feasible, include provisions for handling by an automatic tool changer mechanism for transfer between the storage feature and the "Spindle" or "Non—Rotating Socket".
- 3.14 Coolant Flow Through "Tool Holder—Basic": The "Tool Holder—Basic" may have provision, where applicable, to permit the flow of coolant through it from the "Spindle" or "Non—Rotating Socket" to the "Tool" in an amount and at a pressure to meet the specifications.
- 3.15 Tool Selection: There are three basic types of automatic tool selection systems. They are:
- 3.15.1 Tool Identification: An automatic tool changer system which selects and picks up a particular "Tool Set—up" from random magazine storage on a control system command signal that phases with informational coding that is integral with the "Tool Holder—Basic".
- 3.15.2 Storage Identification — Variable: An automatic tool changer system which selects and picks up a particular "Tool Set—up" from random magazine storage on a control system command signal that phases with informational coding at a fixed station other than on the "Tool Set—up" proper. The magazine storage coding media is correlated to and variable in regard to sequential position of the magazine proper.
- 3.15.3 Storage Identification — Fixed: An automatic tool changer system that does not sense the selection of a "Tool Set—up" or in any way make a selection in terms of random position loading in a tool changer magazine. The selection process is a correlation of the control system command that calls for a specific magazine position in which a particular "Tool Set—up" has been placed according to a pre—arranged plan.

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4.0 PRECEPTS AND REQUIREMENTS

- 4.1 Functional Precepts: All Tool Holders—Basic will embrace the following functional precepts unless reflected as optional.
- 4.1.1 Provision for off—line presetting of tool set—up to controlled dimensions.
- 4.1.2 Provision to accept positive axial retention in the machine tool spindle or non—rotating socket.
- 4.1.3 Division into classifications for definition of differences such as size, weight, torque, RPM, and accuracy.
- 4.1.4 Overhang of the Tool Holder—Basic shall be held to a practical minimum.
- 4.1.5 Provision to accept positive drives.
- 4.1.6 Provision, when feasible, for automatic insertion and removal into the machine tool spindle or non—rotating socket.
- 4.1.7 Compatibility for automatic cleaning during mechanical tool change cycle.
- 4.1.8 Provision for automatic angular orientation about the axis of the spindle or non—rotating socket of the machine tool.
- 4.1.9 Provision for positive cutter retention. (Note: Means for orientation and retention of tool or tool adapters within the tool holder—basic is optional other than noted herein, Section 5.2)
- 4.2 Dimensional Requirements
- 4.2.1. Tapered Shank Series, Sheet 6.
- 4.2.2 Cylindrical Shank Series, Sheet 7.
- 4.2.3 Non-rotating Series, Sheet 8.

5.0 GENERAL

- 5.1 The Tool Holder—Basic Taper Shank Series has certain inherent limitations in regard to pre—set application tolerances.
- 5.2 The location of set screws in the Tool Holder—Basic for the retention of tools and tool adapters is optional. However, the choice of set screw position should be such that the value of other functional provisions is not destroyed.
- 5.3 Representative examples of adjustable and fixed axial location arrangements as applied to Cylindrical Shank Tool Holders—Basic, are shown on Sheet 4.
- 5.4 Representative examples of pull stud and axial location adjustment screws, are shown on Sheet 5.
- 5.5 Tool Holders—Basic should be manufactured from alloy steel that is heat treated to provide a Rockwell C55/C60 hardness on exterior surfaces of the finished product. Tool Holders—Basic may have suitably case hardened exterior surfaces.

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