# NAAMS STANDARD APP0898

GLOBAL STANDARD COMPONENTS
NAAMS™

Assembly 12/19/02

**CONNECTIONS FOR PNEUMATIC FLUID POWER APPLICATIONS**

**PORTS AND STUD ENDS WITH ISO 228-1 ('G') THREADS WITH FLAT-FACE SEALING**

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## Foreword

The three North American based automotive companies and supplier communities formed several voluntary project teams in 1992, under the sponsorship of the Auto/Steel Partnership (A/SP). The NAAMS Stamping Team addressed the use of a common metric convention and standard components used with stamping dies. Their work led to the publication of the NAAMS Stamping Standards (originally named Forming and Stamping Standards) in January 1995. The Mechanical Components Project Team similarly addressed the use of a common metric convention and standard components used with body assembly tooling. Their work led to the publication of the NAAMS Assembly Standards (originally named Assembly and Fabrication Standards) in March 1996. The uses of these standards has reduced the variety of functionally similar parts. As a result, automakers are significantly reducing both the cost and the lead-time required to build stamping and assembly tools.

In 1997, both sets of standards were placed on the A/SP web site. This move gives all users quick access to ongoing changes and to new standards as they are introduced.

The A/SP was formed in 1987 as a unique international consortium that includes DaimlerChrysler Corporation, Ford Motor Company, General Motors Corporation and twelve North American steel producers. Although the principal Partnership role is sponsoring and directing applied research and validation, the most important role may be that of the forum for discussing matters of mutual interest and concerns to the automotive, steel and related industries. This open communication channel fosters improved understanding, cooperation and resource leveraging that benefit all participants and optimizes automotive body designs, processes and tooling.

## Introduction

In pneumatic fluid power systems, power is transmitted and controlled through air under pressure within an enclosed circuit.

Components are connected through their threaded ports by fluid connector fittings to tubes and pipes or to hose fittings and hoses.

Ports are integral parts of fluid power components, such as valves, cylinders, filters, etc.

## 1) Scope

This NAAMS Standard specifies dimensions for pneumatic component ports, stud ends and flat-face sealing for use with fittings or connectors used in pneumatic fluid power applications in the automotive industry.

Ports in accordance with this Standard may be used at working pressures up to 1.6 MPa (16 bar*). The permissible working pressure depends on criteria such as the port size, materials, design, working conditions, applications, etc.

*1 bar = 0.1MP = 105 PA; 1 MPa = 1N/mm2

Note: Users of this Standard should ensure that there is sufficient material around the port to maintain the pressure.

## 2) Normative References

The following standards contain provisions, which, through reference in this text, constitute provisions of this NAAMS Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this NAAMS Standard are encouraged to apply the most recent editions of the standards indicated below. Members of NFPA, IEC and ISO maintain registers of currently valid International Standards.

**Specified**

| | |
|---|---|
| ISO 228-1('G' Thread & Port) | Parallel thread form. |
| ISO 1179-1981 | Parallel thread for flat-face sealing. |

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**Allowed**

For ports smaller than G 1/8 see proposed standard ISO/TC131/SC4/WG 9 N333. Only M3, M5, and M7 are allowed.

**Not Allowed**

SAE J1926 ..... Parallel thread for flat-faced sealing.
ISO 6149 ..... Parallel thread for flat-faced sealing.
SAE J476 (NPTF) ..... Tapered thread for fitting and port.
ISO 7-1 ("R" Thread) ..... Tapered thread for fitting.

## 3) Definitions

For the purposes of this Standard, the definitions given in ISO 5598 apply.

## 4) Dimensions

Ports shall conform to the dimensions shown in ISO 1179-1981 with spot face for type "E" sealing.

Stud ends shall conform to ISO 228-1 and the thread length shall not exceed the minimum port thread depth shown in ISO 1179-1981 (E). A

## 5) Requirements

### 5.1) Working Pressure

Ports, stud ends and flat-face sealing shall be designed for use at maximum working pressures of 1.6 MPa (16 bar).

### 5.2) Performance

Ports, stud ends and flat-face sealing shall meet at least the burst and impulse pressures specified in accordance with Section 6.

## 6) Test Methods

Parts used for the cyclic endurance or burst test shall not be tested further, used or returned to stock. Tests shall be conducted at room temperature (23° C ± 5° C).

**6.1) Burst Pressure Test**

**6.1.1) Principle**

Test three samples to confirm that ports, stud ends and sealing meet or exceed a pressure four times the working pressures.

**6.1.2) Materials**

**6.1.2.1) Test Block (Ports)**

Test blocks shall be made from black or clear anodized aluminum

**6.1.2.2) Stud Ends**

Stud ends shall be made from material that meets or exceeds the requirements given in section 5 and 6 of this Standard.

**6.1.2.3) Flat-face Sealing**

Unless otherwise specified, flat-face sealing shall be captive and made from elastomeric compound material that meets or exceeds the requirements given in Section 5 and 6 of this Standard.

**6.1.3) Procedure**

**6.1.3.1) Thread lubrication**

For testing only, threads and contact surfaces shall be lubricated with grease or oil prior to the application or torque, to test the worst possible assembly conditions.

**6.1.3.2) Stud End Torque**

Test stud ends after application of the torque values given in Table 1.

**6.1.3.3) Pressure Rise Rate**

In accordance with NFPA/T2.6.1 R1-1991.

**6.2) Cyclic Endurance (Impulse) Test**

**6.2.1) Principle**

Test 6 samples at the specified working pressure.

**6.2.2) Materials**

Use the same materials as those given in 6.1.2.

**6.2.30 Procedure**

**6.2.3.1) Thread lubrication**

Apply lubricant as specified in 6.1.3.1.

**6.2.3.2) Stud End Torques**

Apply torque as specified in 6.1.3.2.

**6.2.3.3) Cycle and Pressure Rise Rate**

In accordance with NFPA/T2.6.1 R1-1991.

**6.2.4) Requirements**

The 6 samples tested shall pass a cyclic endurance test in accordance with ISO 8934-5 Standard.

**6.3) Test Report**

Test results and conditions shall be reported on the test data form given in Appendix A.

**7) Designation**

**7.1) Ports**

The ports shall be designated by

a) "Port"

b) Reference to NAAMS APP0898

c) Thread size

EXAMPLE: Port NAAMS APP0898 (G 1/4)

**7.2) Stud Ends**

Stud ends shall be designated by

a) "Stud end"

b) reference to NAAMS APP0898

c) thread size

EXAMPLE: Stud end NAAMS APP0898 (G 1/4)

**8) Identification Statement (reference to this NAAMS Standard APP0898)**

Use the following statement in test reports, catalogues and sales literature when electing to comply with this Auto Steel Standard.

"Ports conform to NAAMS Standard APP0898 for pneumatic fluid power applications."

"Stud Ends conform to NAAMS Standard APP0898 for pneumatic fluid power applications."

**Table 1 RECOMMENDED TORQUE**

| Fitting Size | Minimum (N-m) | Maximum (N-m) |
|---|---|---|
| G 1/8 | 7 | 10 |
| G 1/4 | 12 | 20 |
| G 3/8 | 15 | 25 |
| G 1/2 | 30 | 40 |
| G 3/4 | 40 | 50 |

**Appendix A - NAAMS Standard APP0898 Port Test Results**

Port Size: _____

Material of Port: _____

Material of Stud End:_____

Pass burst pressure? Yes or No (64 bar minimum 3 samples)

Pass fatigue test (NFPA T2.6.1 R1-1991)? Yes or No (16 bar minimum 6 samples)