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# AEROSPACE INFORMATION REPORT

SAE AIR1564 REV. A

Issued 1979-02
Revised 1990-10
Reaffirmed 2001-12

## Materials for Fluid Systems Components and Their International Equivalents

1. SCOPE:

This SAE Aerospace Information Report (AIR) summarizes the materials referenced in specifications for components used in USA fluid systems and, where available, the equivalent materials of France, Germany, United Kingdom, and USSR. (See Figures 1 through 8.)

The data in this document compares ISO and NATO materials equivalents to AIR1564, Materials for Fluid Systems Components and Their International Equivalents.

The equivalent material information was obtained from periodicals, books, and data supplied by individual contributors.

No attempt has been made to obtain samples of the materials or conduct physical and chemical analyses to determine if they are equivalent. Anyone using this AIR, therefore, is cautioned to verify for themselves the interchangeability of the specific materials.

Additional contributions of missing or supplemental data should be directed to SAE marked for the attention of Committee G-3.



PREPARED BY
SAE COMMITTEE G-3, AEROSPACE COUPLINGS, FITTINGS, HOSE, AND TUBING ASSEMBLIES



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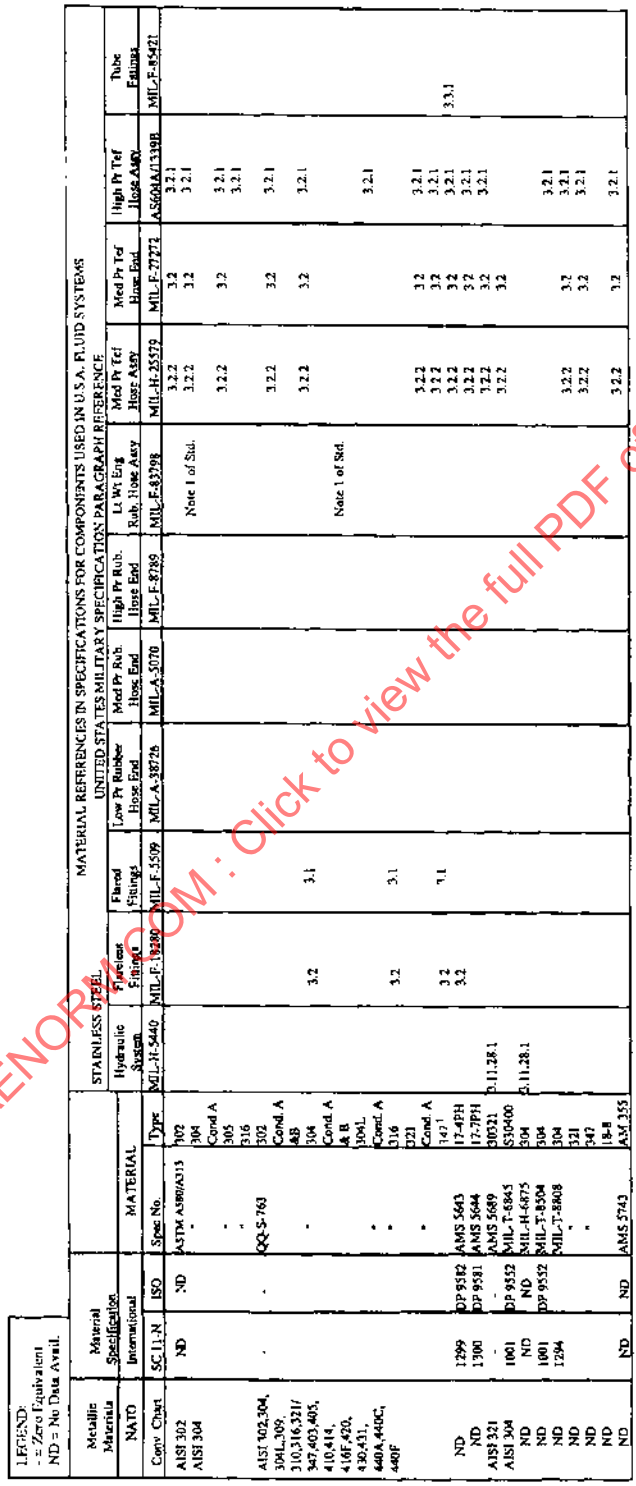


LEGEND:
= Zero Equivalent
ND = No Data Avail.

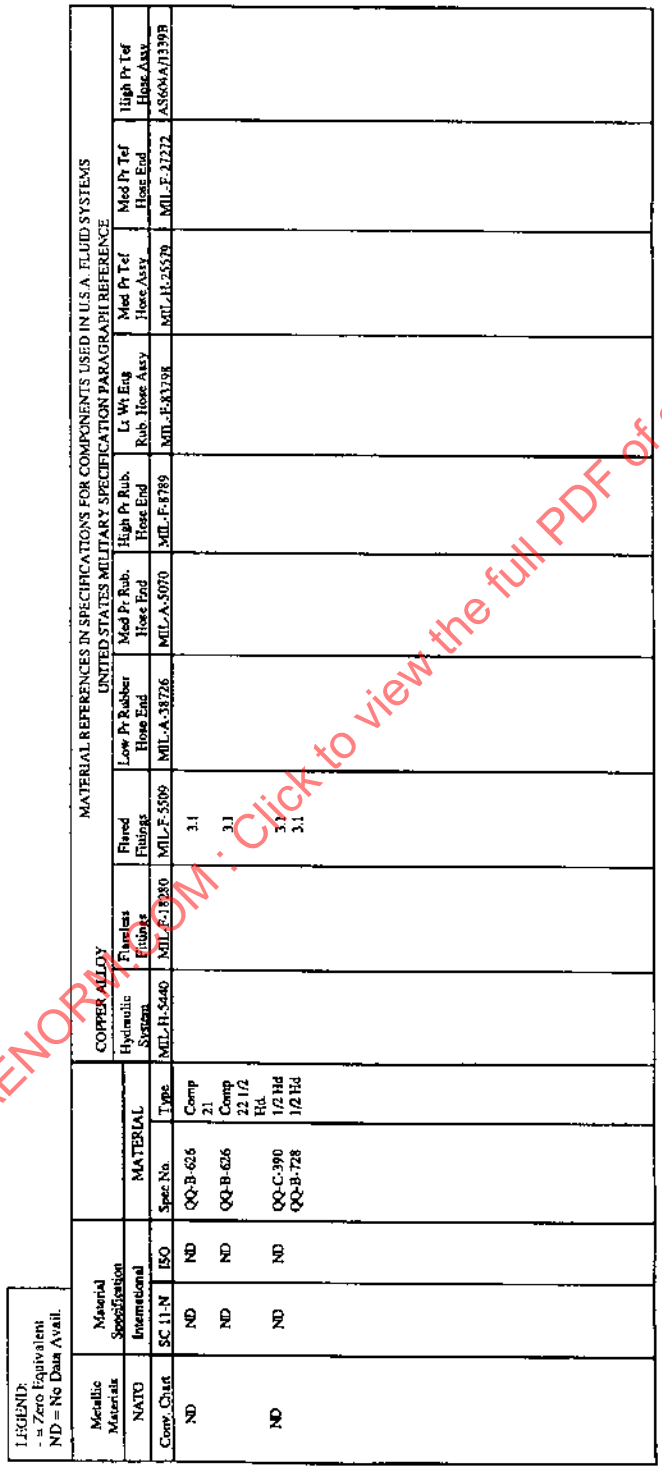
| Metallic Material | Material Specification | | MATERIAL | | STAINLESS STEEL | | MATERIAL REFERENCES IN SPECIFICATIONS FOR COMPONENTS USED IN U.S.A. FLUID SYSTEMS<br>UNITED STATES MILITARY SPECIFICATION PARAGRAPH REFERENCE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Hydraulic Fittings | Flareless Fittings | Flared Fittings | Low Pr Rubber Hose End | Med Pr Rub. Hose End | High Pr Rub. Hose End | Lt Wt Eng Rub. Hose Assy | Med Pr Tef Hose Assy | Med Pr Tef Hose End | High Pr Tef Hose Assy | Tube Extrus |
| NATO | International | ISO | Spec No. | Type | MIL-H-5440 | MIL-F-18280 | MIL-F-5509 | MIL-A-38726 | MIL-A-5070 | MIL-F-8789 | MIL-F-83798 | MIL-H-25579 | MIL-F-27272 | AS604A/13981 | MIL-P-8542 |
| Conv Chart | SC11-N | ISO | Spec No. | Type | | | | | | | | | | | |
| AISI 302 | ND | ND | ASTM A580/A313 | 302 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| AISI 304 | | | - | 304 | | | | | | | Note 1 of Std. | 3.2.2 | 3.2 | 3.2.1 | |
| | | | | Cond A | | | | | | | | | | | |
| | | | | 305 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| | | | - | 316 | | | | | | | | | | 3.2.1 | |
| AISI 302,304, 304L,309, 310,316,321/ 347,403,405, 410,414, 416F,420, 430,431, 440A,440C, 440F | | - | QQ-S-763 | 302 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| | | | | Cond A | | | | | | | | | | | |
| | | | | 4B | | | | | | | | | | | |
| | | | - | 304 | | 3.2 | 3.1 | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| | | | | Cond A | | | | | | | Note 1 of Std. | | | | |
| | | | | A, B | | | | | | | | | | | |
| | | | | 304L | | | | | | | | | | 3.2.1 | |
| | | | - | Cond A | | 3.2 | 3.1 | | | | | | | | |
| | | | - | 316 | | | | | | | | | | | |
| | | | | 321 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| | | | - | Cond A | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| | | | | 1/4H | | 3.2 | 3.1 | | | | | 3.2.2 | 3.2 | 3.2.1 | 3.3.1 |
| ND | 1299 | | DP 9582 | AMS 5643 | | 3.2 | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| ND | 1300 | | DP 9581 | AMS 5644 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| AISI 321 | - | | - | AMS 5689 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| AISI 304 | 1001 | | DP 9552 | MIL-T-6845 | 3.11.28.1 | | | | | | | | | | |
| ND | ND | | ND | MIL-H-6875 | 3.11.28.1 | | | | | | | | | | |
| ND | 1001 | | DP 9552 | MIL-T-8504 | | | | | | | | | | | |
| ND | 1204 | | - | MIL-T-8808 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| ND | | | | 321 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |
| ND | | | | 347 | | | | | | | | | | | |
| ND | | | | 18-8 | | | | | | | | | | | |
| ND | ND | ND | AMS 5743 | AM 355 | | | | | | | | 3.2.2 | 3.2 | 3.2.1 | |

Inactive for new design

NOTE: ISO/TC20/SC11 generated material specifications may not have been reviewed and approved by the U.S.



FIGURE 1 - Material References in Specifications for Components Used in USA Fluid Systems (Stainless Steel)



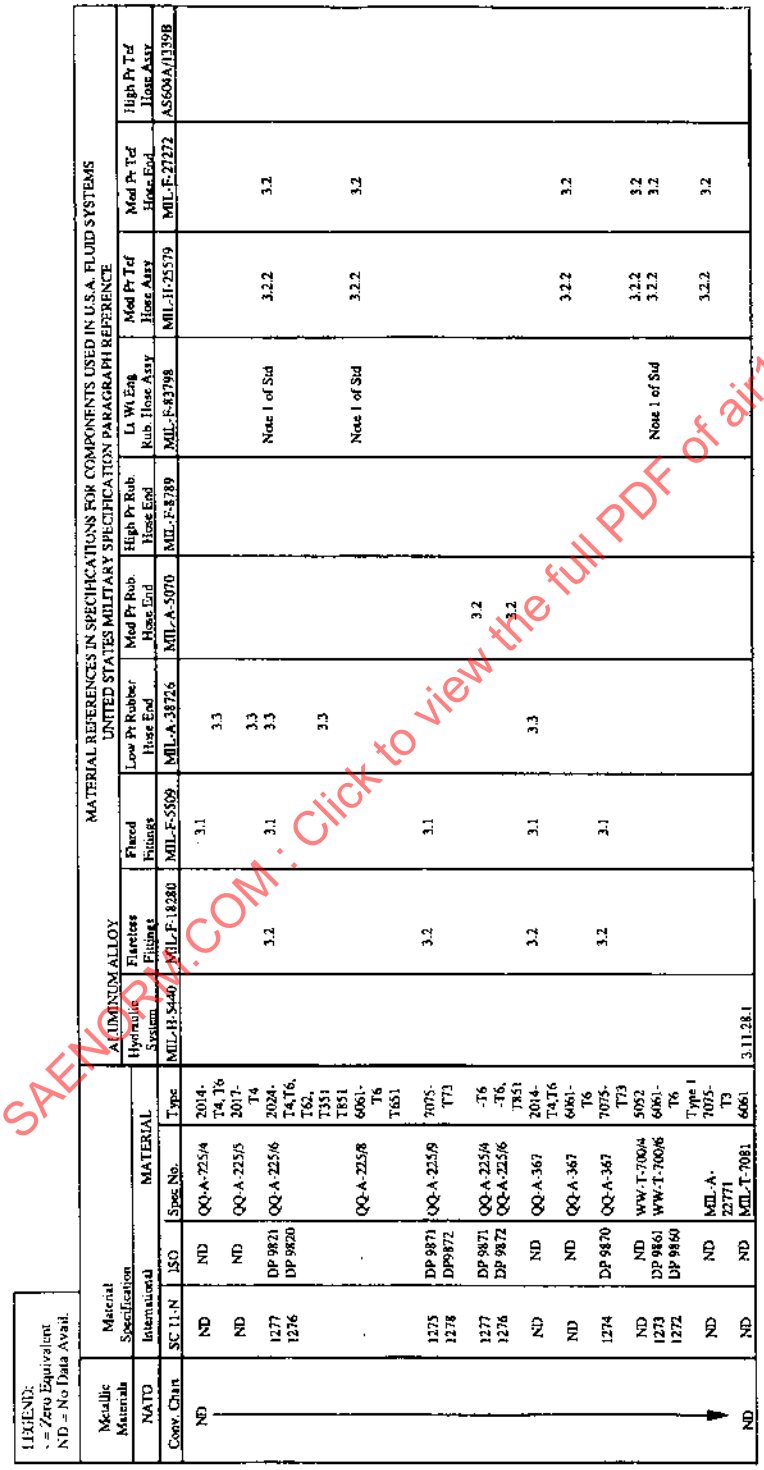
LEGEND:
- = Zero Equivalent
ND = No Data Avail.

| Metallic Materials | | Material Specification | | | | COPPER ALLOY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATO | | International | | MATERIAL | | Hydraulic System | Flareless Fittings | Flared Fittings | Low Pr Rubber Hose End | Med Pr. Rub. Hose End | High Pr Rub. Hose End | Lt. Wt Eng Rub. Hose Assy | Med Pr Tef Hose Assy | Med Pr Tef Hose End | High Pr Tef Hose Assy |
| Conv. Chart | SC 11-N | ISO | Spec No. | Type | | MIL-H-5440 | MIL-F-18280 | MIL-F-5509 | MIL-A-38726 | MIL-A-5070 | MIL-F-8789 | MIL-H-83798 | MIL-H-25579 | MIL-F-27272 | AS604A/13398 |
| ND | ND | ND | QQ-B-626 | Comp 21 | | | | 3.1 | | | | | | | |
| | ND | ND | QQ-B-626 | Comp 22 1/2 Hd. | | | | 3.1 | | | | | | | |
| ND | ND | ND | QQ-C-390 | 1/2 Hd | | | | 3.1 | | | | | | | |
| | | | QQ-B-728 | 1/2 Hd | | | | 3.1 | | | | | | | |

NOTE: ISO/TC20/SC11 generated material specifications may not have been reviewed and approved by the U.S.



FIGURE 2 - Material References in Specification for Components Used in USA Fluid Systems (Copper Alloy)



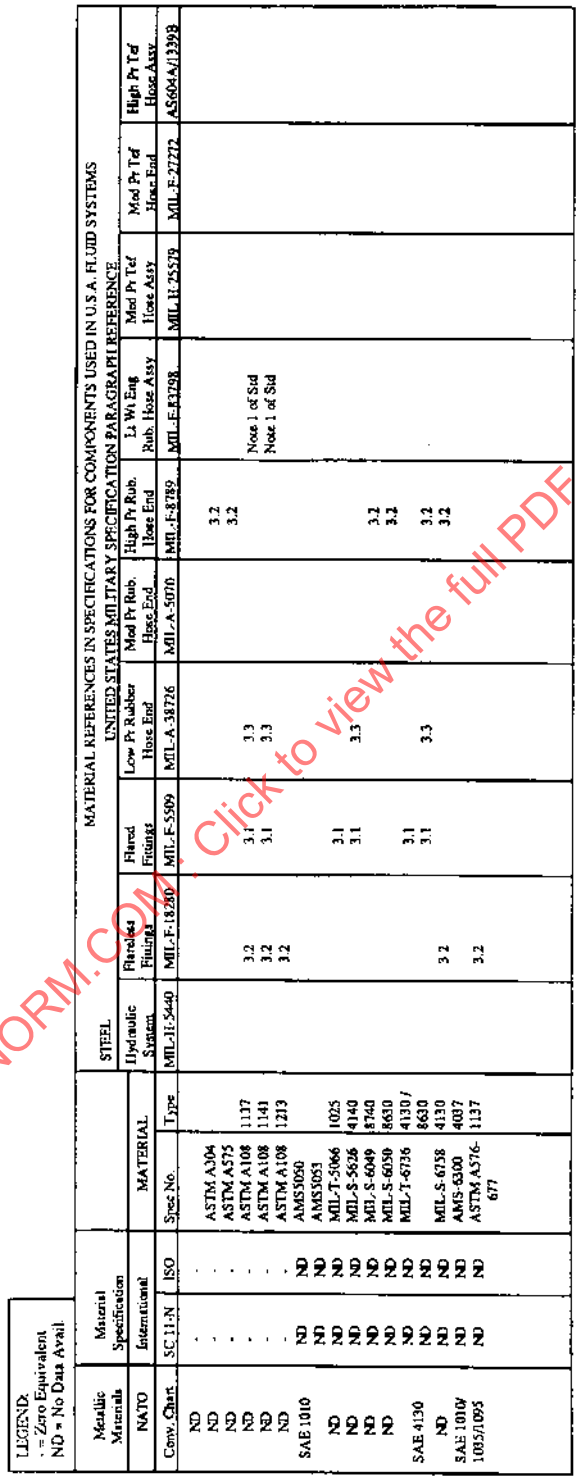
LEGEND:
- = Zero Equivalent
ND = No Data Avail.

| Metallic Materials | Material Specification | | MATERIAL | | ALUMINUM ALLOY Hydraulic System | Fireless Fittings | Fluid Fittings | Low Pr Rubber Hose End | Med Pr Rub. Hose End | High Pr Rub. Hose End | Lt Wt Eng Rub. Hose Assy | Med Pr Tef Hose Assy | Med Pr Tef Hose End | High Pr Tef Hose Assy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATO | International | | | | MATERIAL | | | | | | | | | |
| Conv. Chart | SC 11-N | ISO | Spec No. | Type | MIL-H-5440 | MIL-F-18280 | MIL-F-5509 | MIL-A-38726 | MIL-A-5070 | MIL-P-8789 | MIL-R-83798 | MIL-H-25579 | MIL-F-27272 | AS604A/11398 |
| ND | ND | ND | QQ-A-225/4 | 2014-T4, T6 | | | 3.1 | 3.3 | | | | | | |
| | ND | ND | QQ-A-225/5 | 2017-T4 | | | | 3.3 | | | | | | |
| | 1277 | DP 9821 | QQ-A-225/6 | 2024-T4,T6, T62, T351 | | 3.2 | 3.1 | 3.3 | | | Note 1 of Std | 3.2.2 | 3.2 | |
| | 1276 | DP 9820 | | T851 | | | | | | | | | | |
| | | | QQ-A-225/8 | 6061-T6 T651 | | | | 3.3 | | | Note 1 of Std | 3.2.2 | 3.2 | |
| | 1275 | DP 9871 | QQ-A-225/9 | 7075-T73 | | 3.2 | 3.1 | | | | | | | |
| | 1278 | DP9872 | | | | | | | 3.2 | | | | | |
| | 1277 | DP 9871 | QQ-A-225/4 | -T6 | | | | | 3.2 | | | | | |
| | 1276 | DP 9872 | QQ-A-225/6 | -T6, T851 | | | | | | | | | | |
| | ND | ND | QQ-A-367 | 2014-T4,T6 | | 3.2 | 3.1 | 3.3 | | | | 3.2.2 | 3.2 | |
| | ND | ND | QQ-A-367 | 6061-T6 | | | | | | | | | | |
| | 1274 | DP 9870 | QQ-A-367 | 7075-T73 | | 3.2 | 3.1 | | | | | | | |
| | ND | ND | WW-T-700/4 | 5052 | | | | | | | | 3.2.2 | 3.2 | |
| | 1273 | DP 9861 | WW-T-700/6 | 6061-T6 | | | | | | | Note 1 of Std | 3.2.2 | 3.2 | |
| | 1272 | DP 9860 | | Type I | | | | | | | | | | |
| | ND | ND | MIL-A-22771 | 7075-T3 | | | | | | | | 3.2.2 | 3.2 | |
| ND | ND | ND | MIL-T-7081 | 6061 | 3.11.28.1 | | | | | | | | | |

NOTE: ISO/TC20/SC11 generated material specifications may not have been reviewed and approved by the U.S.



FIGURE 3 - Material References in Specifications for Components Used in USA Fluid Systems (Aluminum Alloy)



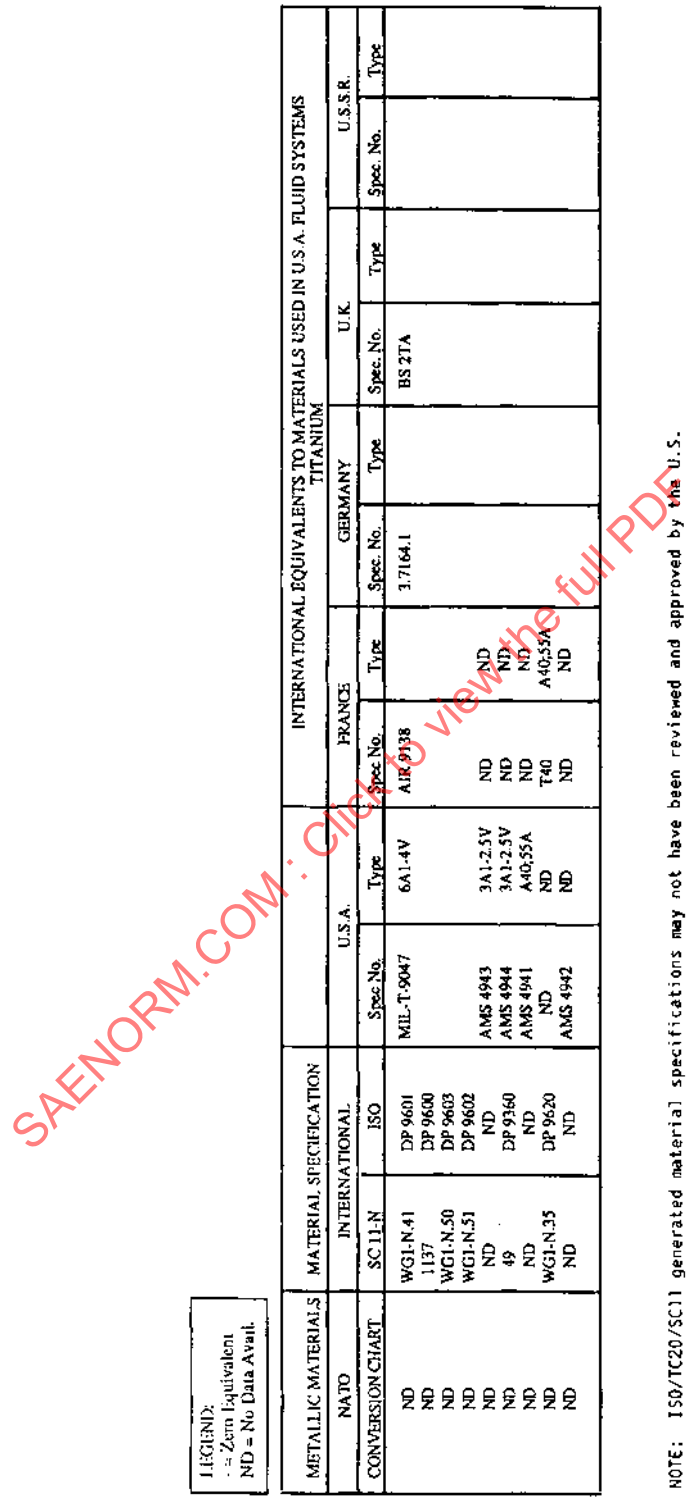
LEGEND:
. = Zero Equivalent
ND = No Data Avail

| Metallic Materials | Material Specification | | MATERIAL | | STEEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Hydraulic System | Flareless Fittings | Flared Fittings | Low Pr Rubber Hose End | Mod Pr Rub. Hose End | High Pr Rub. Hose End | Li Wt Eng Rub. Hose Assy | Mod Pr Tef Hose Assy | Mod Pr Tef Hose End | High Pr Tef Hose Assy |
| NATO | International | | Spec No. | Type | MIL-H-5440 | MIL-F-18280 | MIL-F-5509 | MIL-A-38726 | MIL-A-5070 | MIL-F-8789 | MIL-F-83798 | MIL-H-25579 | MIL-F-27272 | AS6044/13393 |
| Conv. Chart | SC 11-N | ISO | | | | | | | | | | | | |
| ND | - | - | ASTM A304 | | | | | | | 3.2 | | | | |
| ND | - | - | ASTM A575 | | | | | | | 3.2 | | | | |
| ND | - | - | ASTM A108 | 1137 | | 3.2 | 3.1 | 3.3 | | | Note 1 of Std | | | |
| ND | - | - | ASTM A108 | 1141 | | 3.2 | 3.1 | 3.3 | | | Note 1 of Std | | | |
| ND | - | - | ASTM A108 | 1213 | | 3.2 | | | | | | | | |
| SAE 1010 | ND | ND | AMS5050 | | | | | | | | | | | |
| | ND | ND | AMS5053 | | | | | | | | | | | |
| ND | ND | ND | MIL-T-5066 | 1025 | | | 3.1 | | | | | | | |
| ND | ND | ND | MIL-S-5626 | 4140 | | | 3.1 | 3.3 | | | | | | |
| ND | ND | ND | MIL-S-6049 | 8740 | | | | | | 3.2 | | | | |
| ND | ND | ND | MIL-S-6050 | 8630 | | | | | | 3.2 | | | | |
| | ND | ND | MIL-T-6736 | 4130 / 8630 | | | 3.1 | | | | | | | |
| SAE 4130 | ND | ND | | | | | 3.1 | 3.3 | | 3.2 | | | | |
| ND | ND | ND | MIL-S-6758 | 4130 | | 3.2 | | | | 3.2 | | | | |
| SAE 1010/ | ND | ND | AMS-6300 | 4037 | | | | | | | | | | |
| 1035/1095 | ND | ND | ASTM A576-677 | 1137 | | 3.2 | | | | | | | | |

NOTE: ISO/TC20/SC11 generated material specifications may not have been reviewed and approved by the US.



FIGURE 4 - Material References in Specifications for Components Used in USA Fluid Systems (Steel)



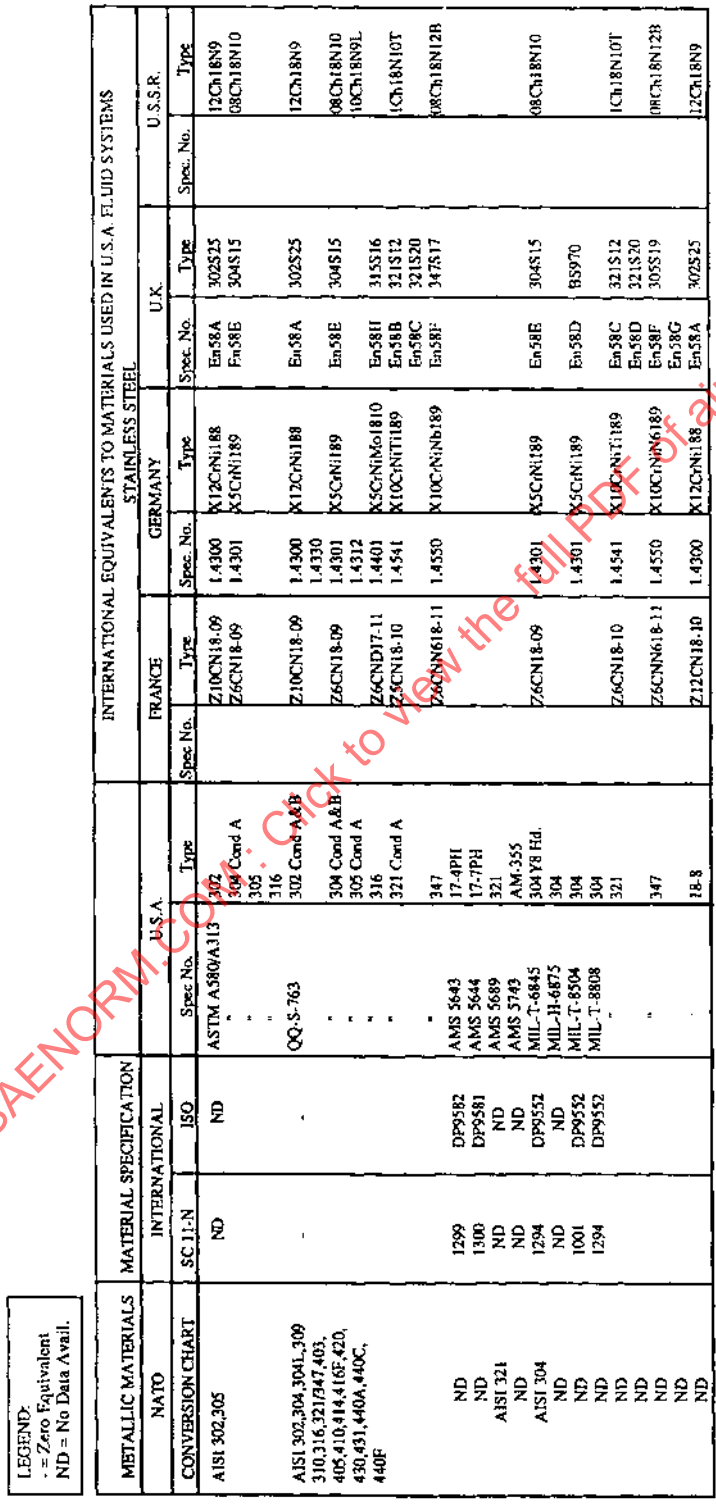
LEGEND:
- = Zero Equivalent
ND = No Data Avail.

| METALLIC MATERIALS | MATERIAL SPECIFICATION | | INTERNATIONAL EQUIVALENTS TO MATERIALS USED IN U.S.A. FLUID SYSTEMS TITANIUM | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | U.S.A. | | FRANCE | | GERMANY | | U.K. | | U.S.S.R. | |
| NATO | INTERNATIONAL | | Spec.No. | Type | Spec.No. | Type | Spec.No. | Type | Spec.No. | Type | Spec.No. | Type |
| CONVERSION CHART | SC 11-N | ISO | | | | | | | | | | |
| ND | WG1-N.41 | DP 9601 | MIL-T-9047 | 6A1-4V | AIR 9138 | | 3.7164.1 | | BS 2TA | | | |
| ND | 1137 | DP 9600 | | | | | | | | | | |
| ND | WG1-N.50 | DP 9603 | | | | | | | | | | |
| ND | WG1-N.51 | DP 9602 | | | | | | | | | | |
| ND | ND | ND | AMS 4943 | 3A1-2.5V | ND | ND | | | | | | |
| ND | 49 | DP 9360 | AMS 4944 | 3A1-2.5V | ND | ND | | | | | | |
| ND | ND | ND | AMS 4941 | A40,55A | ND | ND | | | | | | |
| ND | WG1-N.35 | DP 9620 | ND | ND | T40 | A40,55A | | | | | | |
| ND | ND | ND | AMS 4942 | ND | ND | ND | | | | | | |

NOTE: ISO/TC20/SC11 generated material specifications may not have been reviewed and approved by the U.S.



FIGURE 5 - International Equivalents to Materials Used in USA Fluid Systems (Titanium)



LEGEND:
- = Zero Equivalent
ND = No Data Avail.

INTERNATIONAL EQUIVALENTS TO MATERIALS USED IN U.S.A. FLUID SYSTEMS
STAINLESS STEEL

| METALLIC MATERIALS | MATERIAL SPECIFICATION | | U.S.A. | | FRANCE | | GERMANY | | U.K. | | U.S.S.R. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATO | INTERNATIONAL | | | | | | | | | | | |
| CONVERSION CHART | SC 11-N | ISO | Spec. No. | Type | Spec. No. | Type | Spec. No. | Type | Spec. No. | Type | Spec. No. | Type |
| AISI 302,305 | ND | ND | ASTM A580/A313 | 302 | | Z10CN18-09 | 1.4300 | X12CrNi188 | En58A | 302S25 | | 12Ch18N9 |
| | | | " | 304 Cond A | | Z6CN18-09 | 1.4301 | X5CrNi189 | En58E | 304S15 | | 08Ch18N10 |
| | | | " | 305 | | | | | | | | |
| | | | " | 316 | | | | | | | | |
| AISI 302,304,304L,309 | - | - | QQ-S-763 | 302 Cond A&B | | Z10CN18-09 | 1.4300 | X12CrNi188 | En58A | 302S25 | | 12Ch18N9 |
| 310,316,321/347,403, | | | | | | | 1.4330 | | | | | |
| 405,410,414,416F,420, | | | " | 304 Cond A&B | | Z6CN18-09 | 1.4301 | X5CrNi189 | En58E | 304S15 | | 08Ch18N10 |
| 430,431,440A,440C, | | | " | 305 Cond A | | | 1.4312 | | | | | 10Ch18N9L |
| 440F | | | " | 316 | | Z6CND17-11 | 1.4401 | X5CrNiMo1810 | En58H | 316S16 | | |
| | | | " | 321 Cond A | | Z6CNT18-10 | 1.4541 | X10CrNiTi189 | En58B | 321S12 | | 1Ch18N10T |
| | | | | | | | | | En58C | 321S20 | | |
| | | | " | | | Z6CNN618-11 | 1.4550 | X10CrNiNb189 | En58F | 347S17 | | 08Ch18N12B |
| ND | 1299 | DP9582 | AMS 5643 | 17-4PH | | | | | | | | |
| ND | 1300 | DP9581 | AMS 5644 | 17-7PH | | | 1.4301 | X5CrNi189 | En58D | B5970 | | |
| AISI 321 | ND | ND | AMS 5689 | 321 | | | | | | | | |
| ND | ND | ND | AMS 5743 | AM-355 | | | | | | | | |
| AISI 304 | 1294 | DP9552 | MIL-T-6845 | 304 Y8 Hd. | | Z6CN18-09 | 1.4301 | X5CrNi189 | En58E | 304S15 | | 08Ch18N10 |
| ND | ND | ND | MIL-H-6875 | 304 | | | | | | | | |
| ND | 1001 | DP9552 | MIL-T-8504 | 304 | | | 1.4301 | X5CrNi189 | En58D | B5970 | | |
| ND | 1294 | DP9552 | MIL-T-8808 | 304 | | | | | | | | |
| | | | | 321 | | Z6CN18-10 | 1.4541 | X10CrNiTi189 | En58C | 321S12 | | 1Ch18N10T |
| ND | | | | | | | | | En58D | 321S20 | | |
| ND | | | " | | | | | | En58F | 305S19 | | |
| | | | | 347 | | Z6CNN618-11 | 1.4550 | X10CrNiNb189 | En58G | | | 08Ch18N12B |
| ND | | | | | | | | | En58A | 302S25 | | |
| ND | | | | 18-8 | | Z12CN18-10 | 1.4300 | X12CrNi188 | | | | 12Ch18N9 |

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FIGURE 6 - International Equivalents to Materials Used in USA Fluid Systems (Stainless Steel)