# Engineering Specification

| CASE | Title: HYDRAULIC HOSE ASSEMBLY | Page: 1 of 17 | No.: ES-B120 |
|---|---|---|---|

| Models Affected: | Rev. G | Date: OCT 2008 | Control: STD |
|---|---|---|---|

| Date | Rev. | Page | Changes | Release Number | By | Ck. |
|---|---|---|---|---|---|---|
| JUN 1977 | * | | Issued | | | |
| MAY 1988 | * | | Revised | | | |
| MAR 1987 | * | | Revised. Also replaced MS-553. | | | |
| FEB 1988 | * | | Added Class 21 & 1/4 (-4) Class 20. Revised description of Class 20. Add Aeroquip & delete Goodyear as approved sources. | | | |
| MAR 1992 | B | All | Approved sources revised & info moved from Appendix to QSP 553. Document retyped with minor format changes. | STD9201 | | |
| DEC 1994 | C | All | Added Paint Compatibility Code H to Table III. Added reference to cleanliness spec ES-A7003 where tested to ES-A7146 to 5.4. Corrected reference to Case Test Procedure C-801 to PDP 08-006-A in Table IV and 5.6.1. Changed contact from Component Manager to Committee Chairman in 5.6.1. Revised section 5.7 to include legibility of identification after painting and to add max. dynamic working pressure and date of hose material manufacture to the identification requirements. | * | SH | |
| FEB 1999 | D | All | Changed Class 21 construction from “one braid” to “one or two braids.” Added Classes 22 through 25. Update SAE fitting codes. Removed “English” dimensions in Tables I, II, and III, as well as Tables in 3.4, 3.5, and 3.6. Clarified section 4.2 to indicate 37° flare settings. Reworded 5.8. | STD9902 | SH | |
| APR 2005 | E | All | Added section 2.6 indicating that the hose cover color must be black on all classes except 16 and 17. | 35009282 | SH | |
| MAY 2008 | F | All | Added Class 24A (100R16 Type S) hose to Section 3.2 and the corresponding data to Table I, Table II and Section 3.7. Burst Pressure 160 MPa was 140 MPa for High Pressure classification in Section 3.7 and note added as a pointer to Table I for burst pressure data for different sizes. | 35065843 | SS | |
| OCT 2008 | G | All | Modified section 5.7 on Hose Identification. Added Hose Class 26 (SAE 100R6) to Section 3.2 and Tables I and II. | 35073842 | SS | |

Approvals
S.W. HILE 28OCT08

1. SCOPE

This specification covers coupled hydraulic hoses. It establishes standards for hose assemblies to be acceptable for use in Case products.

2. GENERAL

2.1 All hydraulic hose shall conform to SAE Standards J517 and J30 (latest revision) and additional requirements outlined in this standard.

2.2 All hydraulic hose fittings shall conform to SAE Standard J516 and J518 (latest revisions) permanently attached style and to additional requirements outlined in this standard.

2.3 All assemblies not covered herein will be considered as non-standard.

2.4 Every effort has been made to use "whole metric" dimensions wherever possible. However, where no metric sizing has been established, such as "nominal hose I.D." and "thread configuration", the accepted U.S. Standard has been selected.

2.5 This specification is based on mechanical properties and performance. Methods of construction are the responsibility of the supplier unless specifically restricted.

2.6 The hose cover must be black for Classes 1 - 15 and 18 – 25, unless otherwise specified on the drawing. A hose material identification line, or lay-line, per SAE J517, must be present and may be any color.

3. DESIGN

3.1 Classification of Hoses

Hydraulic oil hose assemblies used by the company are classified by material, minimum burst pressure, and minimum bend radius as shown in Tables I and II. When selecting a hose for an application, the working pressure rating is equal to one-fourth (1/4) minimum burst pressure.

Hose construction of Classes 1 through 15, 18 through 21, and 23 through 25, generally consists of a reinforced elastomeric material. The elastomeric portion of these hoses consists of a smooth bore, seamless, hydraulic fluid resistant tube, and a hydraulic fluid and weather resistant cover.

Hose construction of Classes 16 and 17 generally consists of a reinforced thermoplastic material. The thermoplastic portion of these hoses consists of a seamless, hydraulic fluid resistant tube and a hydraulic fluid and weather resistant cover.

Hose construction of Class 22 consists of a smooth bore, seamless, and reinforced Polytetrafluorethylene (PTFE) material.

3.2 Property Requirements

Material purchased to this specification shall meet the basic property requirements shown in Table I and Table II and the applicable suffix requirements shown in Table III. Also, Classes 1 through 21 and 23 through 25 shall perform satisfactorily over a normal operating range of -40° to 94°C, except where an A1 or A2 suffix is specified. Class 22 shall perform satisfactorily over a normal operating range of -54° to 204°C.

Hoses in this specification are for use with petroleum base fluids within a temperature range stated above and with water base hydraulic fluids within the temperature ranges agreed upon by the manufacturers of both the hose and the fluid. Class 16, 17, and 22 are also for use with synthetic base hydraulic fluids.

Classes

The following classes are based on type of construction and reinforcement, generally in concurrence with SAE Standards J517 and J30.

| | | SAE Fitting Code |
|---|---|---|
| Class 1 | Same as 30R2, Type 1, per SAE J30 (latest issue). Reinforced between tube and cover with one ply of braided, knit, spiral or woven fabric. | |
| Class 2 | Same as 30R2, Type 2, per SAE J30 (latest issue). Reinforced between tube and cover with two braided plies of woven fabric. | |
| Class 3 | Same as 30R2, Type 3, per SAE J30 (latest issue). Reinforced between tube and cover with one braided ply of textile yarn. | |
| Class 4 | Same as 100R4, per SAE J517 (latest issue). Usually used for vacuum application. Reinforced between tube and cover with a ply or plies of woven or braided textile fibers with a suitable spiral of body wire. | 45 |
| Class 5 | Same as 100R3, per SAE J517 (latest issue). Reinforced between tube and cover with two braids of suitable textile yarn. | 44 |
| Class 6 | Same as 100R5, per SAE J517 (latest issue). Reinforced with two textile braids separated by a high tensile steel wire braid. All braids are to be impregnated with oil and mildew restraint synthetic rubber compound. | 46 |
| Class 7 | Same as 100R1, per SAE J517 (latest issue). Reinforced between tube and cover with one wire braid. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 42 |

| | | SAE Fitting Code |
|---|---|---|
| Class 8 | Same as 100R2, Type A, per SAE J517 (latest issue). Reinforced between tube and cover with two braids of wire. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire.<br><br>Optional Construction<br><br>Same as 100R2, Type B, per SAE J517 (latest issue). Similar to Type A, except two spiral plies and one braid of wire reinforcement. | 43 |
| Class 9 | Deleted. Formerly in MS-553. Use Class 8. | |
| Class 10 | Same as 100R9, Type A, per SAE J517 (latest issue). Reinforced between tube and cover with 4-spiral plies of wire wrapped in alternating directions. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 50 |
| Class 12 | Same as 100R10, Type A, per SAE J517 (latest issue). Same as Class 10, except reinforcement to be 4-spiral plies of heavy wire wrapped in alternating directions. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 51 |
| Class 13 | Same as 100R11, per SAE J517 (latest issue). Same as class 10, except reinforcement to be six spiral plies of heavy wire wrapped in alternating directions. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 52 |
| Class 14 | Deleted. Formerly in MS-553. Use Class 3, 5 or 7. | |
| Class 15 | Same as 100R12, per SAE J517 (latest issue). Hose construction same as Class 12. | 77 |
| Class 16 | Same as 100R7, per SAE J517 (latest issue). Tube is reinforced with suitable synthetic fiber, (Thermoplastic). | 48 |
| Class 17 | Same as 100R8, per SAE J517 (latest issue). Same as Class 16, except tube has thicker wall and/or better reinforcement, (Thermoplastic). | 49 |
| Class 18 | Same as 100R13, per SAE J517 (latest issue). Reinforcement between tube and cover is multiple plies (4 heavy spiral plies up to 1 inch size and 6 spiral plies over 1 inch size) or spirally wrapped wire separated by interply friction layers. A ply of braid or suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 78 |

| | | SAE Fitting Code |
|---|---|---|
| Class 19 | Similar to 100R1, Type AT, per SAE J517 (latest issue), except has higher pressure rating. Reinforced between tube and cover with one wire braid. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 53 |
| Class 20 | Same as 100R2, Type AT or BT, per SAE J517 (latest issue) pressure rating, except is special hi-flex hose with smaller bend radius. Reinforced between tube and cover with one or two braids of wire. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 54 |
| Class 21 | Similar to 100R1, Type AT, per SAE J517 (latest issue), except has higher pressure rating and is special hi-flex hose with smaller bend radius. Reinforced between tube and cover with one or two braids of wire. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 53 |
| Class 22 | Same as 100R14, per SAE J517 (latest issue). Polytetrafluorethylene (PTFE) inner tube reinforced with a single braid of 303XX series stainless steel. | 79 or 80 |
| Class 23 | Same as 100R15, per SAE J517 (latest issue). Reinforcement between tube and cover is multiple spiral plies or heavy wire wrapped in alternating directions and an oil and weather resistant synthetic rubber cover. A ply or braid or suitable material may be used over or within the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 90 |
| Class 24 | Same as 100R16 per SAE J517 (latest issue). Reinforced between tube and cover with one wire braid. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 91 |
| Class 24A | Same as 100R16 Type S per SAE J517 (latest issue). One or two wire braids of reinforcement according to hose design. | 99 |
| Class 25 | Same as 100R17 per SAE J517 (latest issue). Reinforced between tube and cover with one or two wire braids. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire. | 93 |
| Class 26 | Same as 100R6 per SAE J517 (latest issue). Inner tube of oil resistant synthetic rubber, one braid of suitable fiber and an oil and weather resistant synthetic rubber cover. | 47 |

TABLE I - MINIMUM BURST PRESSURES in MPa (Up to and including 23 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 6.3 | 8 | 10 | 12.5 | 16 | 19 | 22.2 |
| | | (3/16) | (1/4) | (5/16) | (3/8) | (1/2) | (5/8) | (3/4) | (7/8) |
| 1 | 30R2 Type 1 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 3.4 | 3.4 | |
| 2 | 30R2 Type 2 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 3.4 | 3.4 | 3.4 |
| 3 | 30R2 Type 3 | 13.8 | 11.0 | 11.0 | 11.0 | 11.0 | 9.7 | 8.3 | |
| 4 | 100R4 | | | | | | | 8.3 | |
| 5 | 100R3 | 41.4 | 34.5 | 33.1 | 31.0 | 27.6 | 24.1 | 20.7 | |
| 6 | 100R5 | 82.7 | 82.7 | 62.0 | | 48.3 | 41.4 | | 22.1 |
| 7 | 100R1 | 82.7 | 75.8 | 68.9 | 62.0 | 55.2 | 41.4 | 34.5 | 31.0 |
| 8 | 100R2 Type A&B | 137.9 | 137.9 | 117.2 | 110.3 | 96.5 | 75.8 | 62.0 | 55.2 |
| 10 | 100R9 | | | | 124.1 | 110.3 | | 82.7 | |
| 12 | 100R10 | 275.8 | 241.3 | | 206.8 | 172.4 | | 137.9 | |
| 13 | 100R11 | 344.7 | 310.3 | | 275.8 | 206.8 | | 172.4 | |
| 15 | 100R12 | | | | 110.3 | 110.3 | 110.3 | 110.3 | |
| 16 | 100R7 | 82.7 | 75.8 | 68.9 | 62.0 | 55.2 | 41.4 | 34.5 | |
| 17 | 100R8 | 137.9 | 137.9 | | 110.3 | 96.5 | 75.8 | 62.0 | |
| 18 | 100R13 | | | | | | | 137.9 | |
| 19 | | | 75.8 | | 68.5 | 68.5 | | | |
| 20 | | | 137.9 | | 110.3 | 96.5 | 75.8 | 62.0 | |
| 21 | | | 75.8 | | 75.8 | 75.8 | 75.8[(1)] | 75.8[(1)] | |
| 22 | 100R14 | 68.9 | 62.0 | 55.2 | 48.3 | 41.5 | 34.5 | 27.6 | 24.1 |
| 23 | 100R15 | | | | 165.5 | 165.5 | | 165.5 | |
| 24 | 100R16 | | 137.9 | 117.2 | 110.3 | 96.5 | 75.8 | 62.0 | |
| 24A | 100R16 Type S | | 160.0 | 140.0 | 132.0 | 110.0 | 100.0 | 86.0 | |
| 25 | 100R17 | | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | |
| 26 | 100R6 | 14.0 | 11.2 | 11.2 | 11.2 | 11.2 | 9.6 | 8.4 | |

[(1)] No hoses have been qualified for this size.

TABLE I (continued) - MINIMUM BURST PRESSURES in MPa (25 to 64 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 25 | 28.5 | 31.5 | 35 | 38 | 51 | 63.5 |
| | | (1) | (1-1/8) | (1-1/4) | (1-3/8) | (1-1/2) | (2) | (2-1/2) |
| 1 | 30R2 Type 1 | 3.4 | | | | | | |
| 2 | 30R2 Type 2 | 3.4 | 2.8 | 2.8 | 2.8 | 2.8 | 1.7 | |
| 3 | 30R2 Type 3 | | | | | | | |
| 4 | 100R4 | 6.9 | | 5.5 | | 4.1 | 2.8 | 1.7 |
| 5 | 100R3 | 15.5 | | 10.3 | | | | |
| 6 | 100R5 | | 17.2 | | 13.8 | | | |
| 7 | 100R1 | 27.6 | | 17.2 | | 13.8 | 10.3 | |
| 8 | 100R2 Type A&B | 55.2 | | 44.8 | | 34.5 | 31.0 | 27.6 |
| 10 | 100R9 | 82.7 | | 68.9 | | 55.2 | 55.2 | |
| 12 | 100R10 | 110.3 | | 82.7 | | 68.9 | 68.9 | |
| 13 | 100R11 | 137.9 | | 96.5 | | 82.7 | 82.7 | 69.0 |
| 15 | 100R12 | 110.3 | | 82.7 | | 69.0 | 69.0 | |
| 16 | 100R7 | 27.6 | | | | | | |
| 17 | 100R8 | 55.2 | | | | | | |
| 18 | 100R13 | 137.9 | | 137.9 | | 137.9 | 137.9 | |
| 19 | | | | | | | | |
| 20 | | 55.2(1) | | | | | | |
| 21 | | 75.8(1) | | | | | | |
| 22 | 100R14 | 24.1 | 17.2 | | | | | |
| 23 | 100R15 | 165.5 | | 165.5 | | 165.5 | | |
| 24 | 100R16 | 55.2 | | 44.8 | | | | |
| 24A | 100R16 Type S | 66.0 | | 50.0 | | | | |
| 25 | 100R17 | 84.0 | | | | | | |

(1) No hoses have been qualified for this size.

TABLE I (continued) - MINIMUM BURST PRESSURES in MPa (over 64 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | |
|---|---|---|---|---|
| | | 76 | 89 | 102 |
| | | (3) | (3-1/2) | (4) |
| 4 | 100R4 | 1.5 | 1.2 | 1.0 |

TABLE II - MINIMUM BEND RADII in mm (Up to and including 23 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 6.3 | 8 | 10 | 12.5 | 16 | 19 | 22.2 |
| | | (3/16) | (1/4) | (5/16) | (3/8) | (1/2) | (5/8) | (3/4) | (7/8) |
| 1 | 30R2 Type 1 | 65 | 65 | 75 | 75 | 100 | 115 | 140 | |
| 2 | 30R2 Type 2 | | 75 | | 100 | 125 | 140 | 150 | |
| 3 | 30R2 Type 3 | 65 | 65 | 75 | 75 | 100 | 115 | 140 | |
| 4 | 100R4 | | | | | | | 125 | |
| 5 | 100R3 | 75 | 75 | 100 | 100 | 125 | 140 | 150 | |
| 6 | 100R5 | 75 | 85 | 100 | | 140 | 165 | | 190 |
| 7 | 100R1 | 90 | 100 | 115 | 125 | 175 | 200 | 240 | 280 |
| 8 | 100R2 Type A&B | 90 | 100 | 115 | 125 | 175 | 200 | 240 | 280 |
| 10 | 100R9 | | | | 125 | 175 | | 240 | |
| 12 | 100R10 | 100 | 125 | | 150 | 200 | | 280 | |
| 13 | 100R11 | 100 | 125 | | 150 | 200 | | 280 | |
| 15 | 100R12 | | | | 125 | 175 | 205 | 240 | |
| 16 | 100R7 | 90 | 100 | 115 | 125 | 175 | 200 | 240 | |
| 17 | 100R8 | 90 | 100 | | 125 | 175 | 200 | 240 | |
| 18 | 100R13 | | | | | | | 240 | |
| 19 | | | 100 | | 125 | 175 | | | |
| 20 | | | 50 | | 65 | 90 | 100 | 120 | |
| 21 | | | 50 | | 65 | 90 | 100[(1)] | 120[(1)] | |
| 22 | 100R14 | 50 | 75 | 100 | 125 | 165 | 200 | 230 | 230 |
| 23 | 100R15 | | | | 155 | 205 | | 270 | |
| 24 | 100R16 | | 50 | 55 | 65 | 90 | 100 | 120 | |
| 24A | 100R16 Type S | | 50 | 55 | 65 | 90 | 100 | 120 | |
| 25 | 100R17 | | 50 | 55 | 65 | 90 | 105 | 125 | |
| 26 | 100R6 | 50 | 65 | 75 | 75 | 100 | 125 | 150 | |

NOTE: Bend radii for Classes 1, 2 and 3 are not indicated by SAE. These values are approximate and may vary by supplier.

(1) No Hoses have been qualified for this size.

TABLE II (continued) - MINIMUM BEND RADII in mm (25 to 64 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 25 | 28.5 | 31.5 | 35 | 38 | 51 | 63.5 |
| | | (1) | (1-1/8) | (1-1/4) | (1-3/8) | (1-1/2) | (2) | (2-1/2) |
| 1 | 30R2 Type 1 | 200 | | | | | | |
| 2 | 30R2 Type 2 | 200 | | | | | | |
| 3 | 30R2 Type 3 | | | | | | | |
| 4 | 100R4 | 150 | | 200 | | 250 | 305 | 355 |
| 5 | 100R3 | 200 | | 255 | | | | |
| 6 | 100R5 | | 230 | | 270 | | | |
| 7 | 100R1 | 305 | | 420 | | 510 | 635 | |
| 8 | 100R2 Type A&B | 305 | | 420 | | 510 | 635 | 760 |
| 10 | 100R9 | 305 | | 420 | | 510 | 660 | |
| 12 | 100R10 | 355 | | 460 | | 560 | 710 | |
| 13 | 100R11 | 355 | | 460 | | 560 | 710 | 915 |
| 15 | 100R12 | 305 | | 420 | | 510 | 635 | |
| 16 | 100R7 | 305 | | | | | | |
| 17 | 100R8 | 305 | | | | | | |
| 18 | 100R13 | 305 | | 420 | | 510 | 635 | |
| 19 | | | | | | | | |
| 20 | | 150(1) | | | | | | |
| 21 | | 150(1) | | | | | | |
| 22 | 100R14 | 305 | 405 | | | | | |
| 23 | 100R15 | 330 | | 445 | | 535 | | |
| 24 | 100R16 | 150 | | 210 | | | | |
| 24A | 100R16 Type S | 150 | | 210 | | | | |
| 25 | 100R17 | 150 | | | | | | |

NOTE: Bend radii for Classes 1, 2 and 3 are not indicated by SAE. These values are approximate and may vary by supplier.

(1) No Hoses have been qualified for this size.

TABLE II (continued) - MINIMUM BEND RADII in mm (over 64 mm)

| Class | Approx. SAE Grade | Nominal Inside Diameter in mm (inches) | | |
|---|---|---|---|---|
| | | 76 | 89 | 102 |
| | | (3) | (3-1/2) | (4) |
| 4 | 100R4 | 460 | 535 | 610 |

TABLE III - SUFFIX REQUIREMENTS

| SUFFIX | PROPERTY | REQUIREMENT |
|---|---|---|
| A1 | High Temperature Resistance | Hose assemblies shall perform satisfactorily over a normal operating temperature range of -40° to 121°C. |
| A2 | Higher Temperature Resistance | Hose assemblies shall perform satisfactorily over a normal operating temperature range of -40° to 135°C. |
| E | Electrically Conductive | Inner surface must be electrically conductive so as to preclude buildup of an electrostatic charge. (Option for Class 22) |
| H | Paint Compatibility | Hose cover must be a copolyester material or other approved material that will allow a modified alkyd acrylic enamel paint to cure, or the hose must be sealed or covered with an engineering approved material that will allow alkyd acrylic enamel paint to cure. |
| T | Reduced Outside Diameter | Hoses shall be designed to assemble with fittings which do not require removal of the cover or a portion thereof. |
| V | Resistance to Vacuum Collapse | Hose shall pass the vacuum resistance test outlined in SAE J343 when under an absolute pressure of 16 kPa (25 inches mercury vacuum). |
| Z | Special Requirements | When applicable, additional special requirements may be specified on the drawing. |

The suffix letter follows the class designation.

Example: Class 7A1=Class 7 (100R1) hose with 121°C (A1) temperature requirement.

3.3 The following hose fittings are considered standard, (Reference: SAE J516 latest issue). Other combinations of fittings are non-preferred, but may be used at the discretion of engineering.

| SAE Code | Description |
|---|---|
| 1801XX - | male o-ring boss |
| 2101XX - | male 37° flare |
| 2401XX - | female swivel 37° flare |
| 2403XX - | female swivel 37° flare - 45° angle |
| 2414XX - | female swivel 37° flare - 90° short drop |
| 2415XX - | female swivel 37° flare - 90° long drop |
| 3901XX - | split flange (low pressure) |
| 3902XX - | split flange - 90° angle (low pressure) |
| 4901XX - | split flange - (high pressure) |
| 4902XX - | split flange - 90° angle (high pressure) |
| 5301XX - | female swivel o-ring face seal - straight |
| 5303XX - | female swivel o-ring face seal - 45° angle |
| 5314XX - | female swivel o-ring face seal - 90° short drop |
| 5315XX - | female swivel o-ring face seal - 90° long drop |

NOTE: XX - SAE hose fitting code shown in hose classes per Paragraph 3.1.

3.4 Sizes

For all classes shown in 3.1 and all combinations of ends shown in 3.3, the following hose ID sizes and corresponding thread sizes are considered standard. (Reference: SAE J516 and J517):

| Nominal Hose ID (mm) | O-Ring Boss/37° Flare Thread Size | O-Ring Face Seal Thread Size |
|---|---|---|
| 6.3 | 7/16-20 | 9/16-18 |
| 10 | 9/16-18 | 11/16-16 |
| 12.5 | 3/4-16 | 13/16-16 |
| 16 | 7/8-14 | 1-14 |
| 19 | 1-1/16-12 | 1-3/16-12 |
| 25 | 1-5/16-12 | 1-7/16-12 |
| 31.5 | 1-5/8-12 | 1-11/16-12 |
| 38 | 1-7/8-12 | 2-12 |
| 51 | 2-1/2-12 | |

3.5 Lengths and Tolerances

3.5.1 Preferred hose assembly lengths should be made in even increments of 50 mm for lengths up to 1300 mm and increments of 130 mm thereafter. Other increments are permissible and are at the discretion of individual engineering groups.

3.5.2 Unless otherwise specified, hose assembly length tolerances shall be as follows:

| | |
|---|---|
| 0 to 300 mm | ± 3 mm |
| Over 300 to 460 mm | ± 5 mm |
| Over 460 to 915 mm | ± 6.5 mm |
| Over 915 mm | ± 1% |

3.6 Outside Diameter

Class 1 through 3 - OD must conform to SAE Standard J30.
Class 4 through 18 - OD must conform to SAE Standard J517.
Class 22 through 25 - OD must conform to SAE Standard J517.

| | NOM. ID | OD |
|---|---|---|
| Class 19 | 6.3 | 12.2 - 14.1 |
| | 10 | 16.2 - 18.1 |
| | 12.5 | 19.0 - 21.5 |
| Class 20 | 6.3 | 13.2 - 14.8 |
| | 10 | 16.5 - 18.0 |
| | 12.5 | 19.56 - 22.0 |
| | 16 | 23.0 - 25.0 |
| | 19 | 27.0 - 29.0 |
| Class 21 | 6.3 | 10.92 - 12.92 |
| | 10 | 14.73 - 16.73 |
| | 12.5 | 18.80 - 20.79 |

Note: As more sizes are qualified, their OD dimensions will be added.

3.7 Designer's Guide for Selection of Hoses

| Class | SAE Equivalent | Normal Usage | Available Options (Suffix) | | | |
|---|---|---|---|---|---|---|
| | | | Performance Std. Type[1] | A1 | A2 | T |
| 1 | 30R2, Type 1 | Low Pressure, return or drain line[2] | 2 | | | |
| 2 | 30R2, Type 2 | Low Pressure, return or drain line[2] | 2 | | | |
| 3 | 30R2, Type 3 | Low Pressure, return or drain line[2] | 2 | | | |
| 4 | 100R4 | Low Pressure, Vacuum Resistant | 2 | X | X | |
| 5 | 100R3 | Medium Pressure | 2 | X | X | |
| 6 | 100R5 | Medium Pressure | 2 | X | X | |
| 7 | 100R1 | Medium Pressure | 2 | X | X | X |
| 8 | 100R2, Type A | High Pressure | 2 | X | X | X |
| 10 | 100R9, Type A | Very High Pressure | 2 | | X | |
| 11 | 100R10, Type A | Very High Pressure | 2 | | X | |
| 13 | 100R11 | Very High Pressure | 2 | X | | |
| 15 | 100R12 | Very High Pressure | 2 | X | | |
| 16 | 100R7 | Medium Pressure, Thermoplastic | 2 | | | |
| 17 | 100R8 | High Pressure, Thermoplastic | 2 | | | |
| 18 | 100R13 | Very High Pressure | 2 | X | | |
| 19 | | Medium Pressure | 1 | | | |
| 20 | | High Pressure, Special Hi-Flex Hose[3] | 1 | | | |
| 21 | | Medium Pressure, Special Hi-Flex Hose[3] | 1 | | | |
| 22 | 100R14 | Medium Pressure | 2 | | | |
| 23 | 100R15 | Very High Pressure | 2 | | | |
| 24 | 100R16 | High Pressure | 2 | | | |
| 24A | 100R16 Type S | High Pressure | 2 | | | |
| 25 | 100R17 | Medium Pressure | 2 | | | |

[1] See Paragraph 4.1.
[2] Not intended for pressure pulse applications. Can be used with hose clamps.
[3] Intended for uses where hose will be flexed repeatedly for a high number of cycles.

Pressure Classification:

| | |
|---|---|
| Low Pressure | Up to 14 MPa Burst Pressure |
| Medium Pressure | Up to 84 MPa Burst Pressure |
| High Pressure | Up to 160 MPa Burst Pressure |
| Very High Pressure | Up to 350 MPa Burst Pressure |

See Table I for burst pressure data for individual sizes of hose for each class.

NOTE: For hose/tube assemblies, the pressure rating of the assembly must be to the lowest component. Therefore, selection of the tubing/wall thickness should be to provide a pressure capacity of equal or greater value than the hose material.

4. PERFORMANCE STANDARD

4.1 Qualifications

Hose assemblies shall meet all requirements of this specification and shall be qualified in two (2) types defined as follows:

Type 1: Must fully meet requirements of SAE J517 when tested per SAE J343 and must pass Case hose approval test per Table IV.

Type 2: Must fully meet requirements of SAE J517 when tested per SAE J343.

4.2 Sealing Capability

When 37° fittings are used for hose assemblies, they must meet the requirements of Case Product Engineering Test Procedure C-740.

5. ACCEPTANCE STANDARD

5.1 Material

Material shall be of such quality as to be free from defects which may affect serviceability or appearance. It shall have physical properties as to produce hose and assemblies conforming to the requirements of this specification.

5.2 Dimensions

Inside and outside diameters shall conform to the figures specified in applicable SAE specifications. (Exception - see 3.6 for Class 19, 20 and 21 hose.)

5.3 Workmanship

Hose assemblies shall be constructed to ensure uniform thickness of tubes, covers, and reinforcements and freedom from cuts, breaks, and holes in fittings, tubes and covers and from broken or missing wires, wires extending through cover, looseness of cover or tube, blisters under cover, and other such evidence of poor workmanship.

5.4 Cleaning and Capping

The cleanliness level of hydraulic hose assemblies shall comply with specification ES-A7003, when checked per ES-A7146, to the level specified on the drawing. To protect hose assemblies during shipping and storage, they shall be sealed or capped.

TABLE IV - HOSE APPROVAL TEST

| Test Series | No. of Samples | Test | Requirement |
|---|---|---|---|
| 1 | 3 | 1. Elongation at 68 - 95°F per SAE J343<br>2. Burst test per SAE J343 | Must not exceed -4 to +2% **<br>No indication of leakage or failure below advertised minimum burst. |
| 2 | 3 | 1. Oil resistance - 70 hours immersion in test fluid* at rated temperature per SAE J343. | Bore change must not exceed -10 to +5%. |
| 3 | 3 | 1. Oil aging - 170 hours immersion in test fluid* at 86°F.<br>2. Proof test per SAE J343.<br>3. Cold bend at -40°F per SAE J343.<br>4. Proof test per SAE J343.<br>5. Use for Test Series 5. | Preparation for subsequent test.<br>No indication of leakage or failure.<br>No cracks or indication of failure.<br>No indication of leakage or failure. |
| 4 | 3 | 1. Air/oil aging - filled with test fluid* & capped. Suspend for 170 hours in chamber at vendor rated temperature.<br>2. Proof test per SAE J343.<br>3. Use for Test Series 5. | Preparation for subsequent test.<br>No indication of leakage or failure. |
| 5 | 6 | 1. Flex impulse - Case Product Development Procedure PDP 08-006-A to 200,000 flex cycles. Use three hoses from test series #3 and three from test series #4. | Must meet PDP 08-006-A requirements. No indication of leakage or failure at test pressure. |
| | 5 | 1. Spares for flex impulse test. | |

* Test Fluid = Case MS 1207 Hy-Tran Plus or Case MS 1210 TCH
** See special requirements for class 20 hose per paragraph 5.5.

NOTE: 1. Proof pressure is equal to one-half (1/2) minimum burst pressure.
2. Tests of hoses within a "Test Series" must be conducted sequentially.

Example:
Test Series #3 - 3 hoses must be oil aged, proof tested, cold bend tested, proof tested, then flex impulse tested.

5.5 Special Requirements for Class 20 Hose:

Variance in change in length when pressurized to rated working pressure must not exceed plus or minus 1% from mean value of which a hose (such as size and supplier), has been approved.

**Caution:** Some supplier's covers may be of ultra high abrasion resistance which can result in reduced life expectancy when overlapping one hose against another.

5.6 Documents for Supplier Qualification

5.6.1 Supplier Qualification Performance Standard Type I Approval

A supplier must submit a formal documented report certifying compliance with requirements per Paragraph 4.1 for each specific hose, class and size to the Chairman, Miscellaneous Hydraulic Components Committee. Furthermore, their flex-impulse test machine must be inspected prior and/or during test by hydraulic test personnel to assure strict compliance with PDP 08-006-A test requirements. Upon approval, vendor approved source list will be updated accordingly and circulated to all plant purchasing and supplier quality assurance departments.

5.6.2 Supplier Qualification Performance Standard Type 2 Approval

A new supplier to a using plant must submit a document certifying compliance with requirements per Paragraph 4.1 to purchasing and supplier quality assurance departments of using plants.

5.6.3 Withdrawal of Supplier Qualifications

Case reserves the right to withdraw the qualification of any supplier.

5.6.4 Change of Case Specification (ES-B120) or SAE Standard J517.

Any change in Case Specification (ES-B120) or SAE Standard J517 which would not be compatible with any hose(s) previously certified, may invalidate any such certification(s).

5.7 Hose Assembly Identification. Hose assemblies shall be marked legibly with the following information:

CNH Part Number
Supplier Identifier
Maximum Dynamic Working Pressure
Date of Manufacture of the Hose Material

When required by the ordering plant because of painted finish or when so indicated on the hose assembly drawing, the identification information must be masked to assure legibility after painting.

5.8 Designation on Drawings

Hose designations on drawings shall specify size (ID) and class. Class suffix and performance standard should be added as required.

NOTE: SAE Equivalent, when applicable, should be used in drawing format to assist Purchasing.

Example:

1. 12.5 mm ID, Class 7T Performance Standard Type 2, per ES-B120.

2. 1/2 in ID, Class 19 Performance Standard Type 1, per ES-B120.

5.9 Approved Sources

See Qualified Sources and Products List QSP553.

If specific machine applications require limiting the approved sources for a specific hose class, those limitations shall be specified on the individual part drawing.

NOTE: Class 20 hoses referring to this specification with "D" prefix part numbers must also meet specification ES-D295.