

**Halliburton**

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January 26, 2004

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DOT/RS/PA/DHMS  
UNIT

Associate Administrator for Hazardous Materials Safety  
Research and Special Programs Administration  
U.S. Department of Transportation  
400 7<sup>th</sup> Street, SW  
Washington, DC 20590-0001

**Attention: Exemptions, DHM-31****Application for Exemption: N<sub>2</sub> Compensated Sample Chamber Assembly**

Halliburton Energy Services, Inc., requests an exemption for the manufacture and use of a non-DOT specification cylinder for the transportation of well site oil/natural gas samples.

**§107.105(a)(2):**

Name: **Halliburton Energy Services, Inc.**  
Street Address: **2600 South Second**  
Mailing Address: **P.O. Drawer 1431**  
City, State: **Duncan, OK 73536-0431**  
Telephone Number: **(580) 251-4485**  
E-Mail: **Johnny.Cathey@Halliburton.com**

**§107.105(a)(4)**

The N<sub>2</sub>Compensated Sample Chamber Assembly will be manufactured by Halliburton Energy Services, Inc. at its facility in Houston, TX (Manufacturer's Registration Number M5415), or its authorized vendors, according to the specifications and engineering drawings enclosed.

**§107.105(a)(4)**

Halliburton Energy Services, Inc. requests confidential treatment. All drawings and material selections are proprietary, and disclosure would cause substantial harm to the competitive position of the company.

**§107.105(c)(1)**

Halliburton Energy Services, Inc. seeks relief from §173.201, §173.302, §173.304, in that a non-DOT specification is not authorized; §178.35(e), in that the cylinder is not equipped with a pressure relief device; and, portions of 178.36 as specified herein.

**§107.105(c)(2)**

The proposed modes of transportation are motor vehicle, cargo vessel, rail freight, and cargo only aircraft.

**§107.105(c)(3)**

The exemption proposal is for the use of a non-DOT specification seamless steel cylinder used to transport pressurized oil well formations from the well site to a laboratory for analysis.

**§107.105(c)(4)**

Halliburton Energy Services, Inc. proposes to use the cylinders indefinitely, or until the regulations are amended to cover this package without an exemption. A two year renewal will be submitted in accordance with §107.109.

**§107.105(c)(5)**

Halliburton Energy Services, Inc. seeks relief from §173.201, §173.302, §173.304, in that there is no DOT specification cylinder available to safely and acquire and transport a sample of unknown commodity at high pressure. The sampling of formation fluids from oil and natural gas well involves sophisticated equipment and highly trained personnel in order to obtain and maintain samples at original formation pressure. This special handling/packaging for a small quantity of "unknown" commodity as well as the concern for maintaining "as-obtained" downhole samples creates the need for this exemption request.

Halliburton Energy Services, Inc. requests relief from §178.36(j); §178.36(k), and §178.36(l) on the basis that Halliburton's manufacturing process provides a greater level of quality assurance and a level of safety that meets or exceeds that required by §178.36, while avoiding the destruction of a cylinder from each manufacturing lot.

The proposed cylinder is nearly identical to a cylinder previously authorized under the terms and conditions of DOT-E 12303. The only difference with respect to the pressure containment aspect between the two assemblies is that the lower bulkhead on the original assembly is replaced with a threaded insert coupled with the transport bulkhead on the N<sub>2</sub> Compensated Sample Chamber Assembly. Two copies of the original assembly covered by DOT-E 12303 are enclosed for comparison.

**§107.105(c)(7)**

The cylinders will contain samples classified as:

Proper Shipping Name / Hazardous Materials Description	Hazard Class / Division	Identification Number	Packing Group
Hydrocarbon gases mixtures, compressed, n.o.s.	2.1	UN1964	N/A
Hydrocarbons gases, mixtures, liquefied, n.o.s.	2.1	UN1965	N/A
Nitrogen, Compressed	2.2	UN1066	N/A
Petroleum Crude Oil	3	UN1267	I

**§107.105(c)(8)**

Packaging prescribed is a non-DOT specification oil well sampling cylinder, threaded on both ends, with a design service pressure of 20,000 psig. The cylinders will be transported in an ATA Spec 300 category I box, three per package for shipment.

**§107.105(c)(10)**

Halliburton Energy Services, Inc. certifies that it is in full compliance with all applicable hazardous materials transportation security laws and regulations.

**§107.105(d)**

The enclosed engineering calculations and test results demonstrate that the design and manufacture of the proposed cylinder achieves a level of safety at least equal to that required by regulations; and, is consistent with public interest.

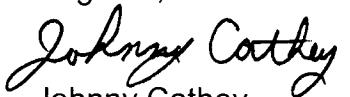
There have been in excess of 430 shipments of the cylinders authorized by DOT-E 12303; which is nearly identical to the proposed cylinder, without any incidents or accidents.

**Competent Authority Approval:**

Halliburton Energy Services, Inc. requests that, if granted, the exemption also be granted competent authority status, so the proposed cylinders may be shipped under the provisions of ICAO.

Please let me know if any additional information is needed.

Regards,



Johnny Cathey

Senior HSE Technical



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## TEST REPORT

CUSOMER: Halliburton Energy Services

TEST DATE: 11-7-03

PART NUMBER: 101326741

SUBMITTED BY: Greg Gilbert

SERIAL NUMBERS: 0227, 0246, 0268

SERVICE PRESSURE : 20,000

### VIRGIN BURST TEST

#### • PURPOSE OF TEST:

Halliburton Part Number 3.78340-C is currently being manufactured in accordance with DOT-E12303. During the original design qualification, a series of burst tests were performed to demonstrate that the end closers O ring seals would fail and release the pressure prior the cylinder rupturing catastrophically. Based on the results, this design was not required to have a Pressure Relief Device installed.

The results also demonstrated that the achieved pressure was also above the test pressure therefore eliminating the chance of any premature release of contents.

The cylinders listed above were fitted with end closers that have been modified from the original design as indicated on the submitted drawing.

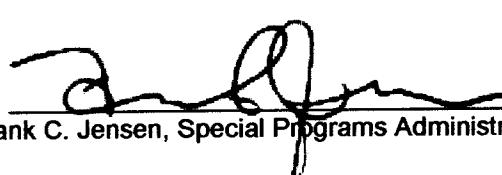
This test was performed to demonstrate that the modifications are not detrimental and do not have any effect on the expected burst pressures and failure modes.

#### TEST RESULTS:

SERIAL NUMBER	BURST PRESSURE	FAILURE MODE
0246	38,000 psig	Failure of the primary end closer o ring
0227	39,400 psig	Failure of the primary end closer o ring
0268	38,500 psig	Failure of the primary end closer o ring

Following the burst test, each cylinder was examined for any signs of weakening or leakage due to the end closer design modifications of which none were noted.

*I hereby certify that the above is true and correct.*

Reported by:  Date: November 21, 2003  
Frank C. Jensen, Special Programs Administrator

WALL STRENGTH CALCULATIONS  
 3.78238 – CYLINDER – 1000 cc – TRANSPORT CHAMBER

49 CFR 178.37 (f) (2) - “**For cylinders with a service pressure of 900 psi or more, the minimum wall shall be such that the wall stress at the minimum specified test pressure shall not exceed 67% of the minimum tensile strength of the steel as determined from the physical tests required in paragraphs (k) and (l) of this section, and must not be over 70,000 psi.**”

49 CFR 178.37 (f) (2) - “**Wall stress calculation must be made with the following formula:**”

$$S = \frac{p(1.3D^2 + .4d^2)}{(D^2 - d^2)}$$

where

$S$  = wall stress in psi ( $\text{lb/in}^2$ )  
 $p$  = minimum test pressure prescribed for water jacket test  $\equiv (5/3) 20,000 \text{ psi}$   
 $D$  = outer cylinder diameter  $= 2.000^{\pm.005} \Rightarrow 1.995 \text{ in. minimum}$   
 $d$  = inside cylinder diameter  $= 1.335 \text{ in. with possible runout of .010} \Rightarrow 1.345 @ \text{minimum material condition.}$

$$S = \frac{\left[ \frac{5}{3}(20,000)(1.3(1.995)^2 + .4(1.345)^2) \right]}{((1.995)^2 - (1.345)^2)} = 90,552 \text{ psi.}$$

The stress level at the hydrostatic test pressure of 33,333 psi ( $5/3 \times 20,000$ ) results in a stress of **90,552 psi** at minimum material condition.

The stress at hydrostatic test pressure must not exceed 67% of the ultimate tensile strength:

$$.67 S_t \geq 90,552$$

$$S_t \geq \frac{90,552}{.67} = 135,152 \text{ psi}$$

170,000 psi minimum ultimate tensile strength  $\geq 135,152 \text{ psi}$ .

Therefore, the stress at hydrostatic test pressure exceeds 70,000 psi but is less than 67% of the material minimum tensile strength.

The ratio of stress at hydrostatic test pressure to material minimum yield strength is:

$$\frac{90,552 \text{ psi}}{125,000 \text{ psi}} = 0.72 = 72\%.$$

The stress at service pressure (20,000 psi) is:

$$S = \frac{(20,000)(1.3(1.995)^2 + .4(1.345)^2)}{(1.995)^2 - (1.345)^2} = 54,331 \text{ psi}.$$

The ratio of minimum ultimate tensile stress to stress at service pressure is:

$$\frac{170,000 \text{ psi}}{54,331 \text{ psi}} = 3.1 \equiv \text{Safety Factor}.$$

The minimum burst pressure is calculated by the following equation:

$$S = \frac{p(1.3D^2 + .4d^2)}{(D^2 - d^2)}, \text{ or}$$

$$p = \frac{S(D^2 - d^2)}{(1.3D^2 + .4d^2)} = \frac{(170,000)((1.995)^2 - (1.345)^2)}{(1.3(1.995)^2 + .4(1.345)^2)} = 62,579 \text{ psi} \text{ min. burst pressure.}$$

3.78328 – CYLINDER – 1000 CC – TRANSPORT CHAMBER  
 1-5/8-10 STUB ACME – 3G Thread Strength

49 CFR 178.36 (h) (3) – “***straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure***”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 2a; Shear Area for Internal Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E d_{\min} \left[ \frac{1}{2n} + \tan \theta (d_{\min} - D_{2_{\max}}) \right]$$

where:  $n$  = no. of threads per inch

$d$  = major diameter – external thread

$L_E$  = length of thread engagement

$\theta$  =  $14.5^\circ$  - stub acme thread

$D_2$  = pitch diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{Allow}} = \frac{\frac{\pi}{4} D_{cyl}^2 P}{\tau_{Allow}}$$

where:  $D_{cyl}$  = internal diameter of cylinder

$P$  = hydrostatic test pressure ( $5/3 \times$  working pressure)

$\tau_{Allow}$  = allowable shear stress of the cylinder material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{cyl}^2 P}{4 \tau_{Allow} n d_{\min} \left[ \frac{1}{2n} + \tan \theta (d_{\min} - D_{2_{\max}}) \right]}$$

Let:  $D_{cyl}$  = 1.335 in.       $P$  =  $5/3 P_{working} = 5/3 (20,000) = 33,333$  psi  
 $d_{\min}$  = 1.620 in.       $D_{2_{\max}}$  = 1.6030 in.  
 $n$  = 10 thd./in.       $\tau_{Allow}$  = .577  $U_{ts} = (.577)(170,000)$  psi

Therefore;  $L_E$  = .172 in.

Length<sub>min</sub> =  $10 \times L_E$  = 1.72 in.

Thread Engagement =  $4.05^{\pm 0.015} - 0.220^{\pm 0.005} - 1.41^{\pm 0.015} = 2.420^{\pm 0.035} \Rightarrow 2.385$  in. (min)

**2.385 ≥ 1.72**

2.385 in. x (10 thd./in.) = 23 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 1-5/8-10 Stub Acme – 3G internal thread of the Cylinder, p/n 3.78328.

3.37330 – UPPER BULKHEAD – TRANSPORT CHAMBER  
 1-5/8-10 STUB ACME – 3G Thread Strength

49 CFR 178.36 (h) (3) – “**straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure**”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 4a; Shear Area for External Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]$$

where:  $n$  = no. of threads per inch       $d_2$  = pitch diameter – external thread  
 $L_E$  = length of thread engagement       $\theta$  =  $14.5^\circ$  - stub acme thread  
 $D_1$  = major diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{cyl}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{cyl}$  = internal diameter of cylinder  
 $P$  = hydrostatic test pressure ( $5/3 \times$  working pressure)  
 $\tau_{\text{Allow}}$  = allowable shear stress of the Upper Bulkhead material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{cyl}^2 P}{4 \tau_{\text{Allow}} n D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]}$$

Let:  $D_{cyl}$  = 1.335 in.       $P$  =  $5/3 P_{\text{working}} = 5/3 (20,000) = 33,333$  psi  
 $d_{2_{\min}}$  = 1.5794 in.       $D_{1_{\max}}$  = 1.5700 in.  
 $n$  = 10 thd./in.       $\tau_{\text{Allow}}$  = .577  $U_{ts} = (.577)(170,000)$  psi.

Therefore;  $L_E$  = .184 in.

Length<sub>min</sub> = 10 x  $L_E$  = 1.84 in.

Thread Engagement =  $4.05^{\pm 0.015} - 0.220^{\pm 0.005} - 1.41^{\pm 0.015} = 2.420^{\pm 0.035} \Rightarrow 2.385$  in. (min)

**2.385 ≥ 1.84**

2.395 in. x (10 thd./in.) = 23 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 1-5/8-10 Stub Acme – 3G external thread of the Upper Bulkhead, p/n 3.78330.

3.78322 – RETAINER – VALVE SEAT – TRANSPORT CHAMBER  
 11/16-16UN - 3A Thread Strength

49 CFR 178.36 (h) (3) – “**straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure**”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 4a; Shear Area for External Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]$$

where:  $n$  = no. of threads per inch       $d_2$  = pitch diameter – external thread  
 $L_E$  = length of thread engagement       $\theta$  =  $30^\circ$  - “V” thread  
 $D_1$  = major diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{\text{bore}}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{\text{bore}}$  = internal diameter of the sealing bore of the Transport Valve  
 $P$  = hydrostatic test pressure ( $5/3 \times$  working pressure)  
 $\tau_{\text{Allow}}$  = allowable shear stress of the Retainer material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{\text{bore}}^2 P}{4 \tau_{\text{Allow}} n D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]}$$

Let:  $D_{\text{bore}} = .517$  in.       $P = 5/3 P_{\text{working}} = 5/3 (20,000) = 33,333$  psi  
 $d_{2_{\min}} = .6433$  in.       $D_{1_{\max}} = .6284$  in.  
 $n = 16$  thd./in.       $\tau_{\text{Allow}} = .577 U_{ts} = (.577)(180,000)$  psi

Therefore;  $L_E = .0535$  in.

Length<sub>min</sub> =  $10 \times L_E = 0.535$  in.

Thread Engagement =  $0.635^{\pm.005} - 0.050^{\pm.025} = 0.585^{\pm.030} \Rightarrow 0.555$  in. (min)

**0.555 ≥ 0.535**

0.555 in. x (16 thd./in.) = 8 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 11/16-16UN – 3A external thread of the Retainer, p/n 3.78322.

3.78321 – STEM - VALVE – TRANSPORT CHAMBER  
 5/16-24UNF - 2A Thread Strength

49 CFR 178.36 (h) (3) – “**straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure**”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 4a; Shear Area for External Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]$$

where:  $n$  = no. of threads per inch       $d_2$  = pitch diameter – external thread  
 $L_E$  = length of thread engagement       $\theta$  =  $30^\circ$  - “V” thread  
 $D_1$  = major diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{\text{seal}}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{\text{seal}}$  = seal diameter of the valve stem  
 $P$  = hydrostatic test pressure ( $5/3 \times$  working pressure)  
 $\tau_{\text{Allow}}$  = allowable shear stress of the Valve Stem material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{\text{seal}}^2 P}{4 \tau_{\text{Allow}} n D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]}$$

Let:  $D_{\text{seal}} = .125$  in.       $P = 5/3 P_{\text{working}} = 5/3 (20,000) = 33,333$  psi  
 $d_{2_{\min}} = .2806$  in.       $D_{1_{\max}} = .2770$  in.  
 $n = 24$  thd./in.       $\tau_{\text{Allow}} = .577 U_{ts} = (.577)(170,000)$  psi

Therefore;  $L_E = .0087$  in.

Length<sub>min</sub> =  $10 \times L_E = 0.087$  in.

Thread Engagement =  $0.275^{\pm.005} \Rightarrow 0.270$  in. (min)

**0.270 ≥ 0.087**

0.270 in. x (24 thd./in.) = 6 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 5/16-24UNF – 2A external thread of the Valve Stem, p/n 3.78321.

101326651 – THREADED INSERT – N<sub>2</sub> COMPENSATED SAMPLE CHAMBER  
1-5/8-10 STUB ACME – 3G Thread Strength

49 CFR 178.36 (h) (3) – “***straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure***”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 4a; Shear Area for External Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]$$

where:       $n$  = no. of threads per inch                           $d_2$  = pitch diameter – external thread  
 $L_E$  = length of thread engagement                           $\theta$  = 14.5° - stub acme thread  
 $D_1$  = major diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{cyl}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{cyl}$  = internal diameter of cylinder  
 $P$  = hydrostatic test pressure (5/3 x working pressure)  
 $\tau_{\text{Allow}}$  = allowable shear stress of the Threaded Insert material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{cyl}^2 P}{4 \tau_{\text{Allow}} n D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]}$$

Let:       $D_{cyl}$  = 1.335 in.                           $P$  = 5/3  $P_{\text{working}}$  = 5/3 (20,000) = 33,333 psi  
 $d_{2_{\min}}$  = 1.5794 in.                           $D_{1_{\max}}$  = 1.5700 in.  
 $n$  = 10 thd./in.                                   $\tau_{\text{Allow}}$  = .577  $U_{ts}$  = (.577)(170,000) psi

Therefore;  $L_E$  = .184 in.

Length<sub>min</sub> = 10 x  $L_E$  = 1.84 in.

Thread Engagement =  $4.18^{\pm 0.015} - 0.20^{\pm 0.015} - 1.54^{\pm 0.015} = 2.440^{\pm 0.045} \Rightarrow 2.395$  in. (min)

**2.395 ≥ 1.84**

2.395 in. x (10 thd./in.) = 23 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 1-5/8-10 Stub Acme – 3G external thread of the Threaded Insert, p/n 101326651.

101326651 – THREADED INSERT – N<sub>2</sub> COMPENSATED SAMPLE CHAMBER  
 1-1/8-10 STUB ACME – 2G Thread Strength

49 CFR 178.36 (h) (3) – “*straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure*”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 2a; Shear Area for Internal Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E d_{\min} \left[ \frac{1}{2n} + \tan \theta (d_{\min} - D_{2_{\max}}) \right]$$

where:  $n$  = no. of threads per inch

$d$  = major diameter – external thread

$L_E$  = length of thread engagement

$\theta$  = 14.5° - stub acme thread

$D_2$  = pitch diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{\text{bore}}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{\text{bore}}$  = internal bore diameter of the Threaded Insert

$P$  = hydrostatic test pressure (5/3 x working pressure)

$\tau_{\text{Allow}}$  = allowable shear stress of the Threaded Insert material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{\text{bore}}^2 P}{4 \tau_{\text{Allow}} n d_{\min} \left[ \frac{1}{2n} + \tan \theta (d_{\min} - D_{2_{\max}}) \right]}$$

Let: $D_{\text{bore}}$	= 1.003 in.	$P$	= 5/3 $P_{\text{working}}$ = 5/3 (20,000) = 33,333 psi
$d_{\min}$	= 1.120 in.	$D_{2_{\max}}$	= 1.1109 in.
$n$	= 10 thd./in.	$\tau_{\text{Allow}}$	= .577 $U_{ts}$ = (.577)(170,000) psi

Therefore;  $L_E$  = .146 in.

Length<sub>min</sub> = 10 x  $L_E$  = 1.46 in.

Thread Engagement =  $2.97^{\pm 0.015} - 0.20^{\pm 0.015} - 1.10^{\pm 0.015} = 1.670^{\pm 0.045} \Rightarrow 1.625$  in. (min)

**1.625 ≥ 1.46**

1.625 in. x (10 thd./in.) = 16 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 1-1/8-10 Stub Acme – 2G internal thread of the Threaded Insert, p/n 101326651.

101326653 – BULKHEAD, TRANSPORT – N<sub>2</sub> COMPENSATED SAMPLE CHAMBER  
1-1/8-10 STUB ACME – 2G Thread Strength

49 CFR 178.36 (h) (3) – “**straight threads having at least 6 engaged threads are authorized. Straight threads must have a tight fit and a calculated shear strength of at least 10 times the test pressure**”.

Thread Strength Calculations:

From FED-STD-H28/2B – Equation 4a; Shear Area for External Threads (minimum material condition - internal and external threads);

$$A_{S_{\min}} = \pi n L_E D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]$$

where:  $n$  = no. of threads per inch                       $d_2$  = pitch diameter – external thread  
 $L_E$  = length of thread engagement                       $\theta$  = 14.5° - stub acme thread  
 $D_1$  = major diameter – internal thread.

Also,

$$A_{S_{\min}} = \frac{F}{\tau_{\text{Allow}}} = \frac{\frac{\pi}{4} D_{\text{bore}}^2 P}{\tau_{\text{Allow}}}$$

where:  $D_{\text{bore}}$  = internal bore diameter of the Threaded Insert  
 $P$  = hydrostatic test pressure (5/3 x working pressure)  
 $\tau_{\text{Allow}}$  = allowable shear stress of the Transport Bulkhead material.

Solving for  $L_E$  yields:

$$L_E = \frac{D_{\text{bore}}^2 P}{4 \tau_{\text{Allow}} n D_{1_{\max}} \left[ \frac{1}{2n} + \tan \theta (d_{2_{\min}} - D_{1_{\max}}) \right]}$$

Let:  $D_{\text{bore}}$  = 1.003 in.                       $P$  = 5/3  $P_{\text{working}} = 5/3 (20,000) = 33,333$  psi  
 $d_{2_{\min}}$  = 1.0707 in.                       $D_{1_{\max}}$  = 1.070 in.  
 $n$  = 10 thd./in.                               $\tau_{\text{Allow}}$  = .577  $U_{ts} = (.577)(170,000)$  psi

Therefore;  $L_E = .159$  in.

Length<sub>min</sub> = 10 x  $L_E$  = 1.59 in.

Thread Engagement =  $2.97^{\pm 0.015} - 0.20^{\pm 0.015} - 1.10^{\pm 0.015} = 1.670^{\pm 0.045} \Rightarrow 1.625$  in. (min)

**1.625 ≥ 1.59**

1.625 in. x (10 thd./in.) = 16 threads (full), therefore, 49 CFR 178.36 (h) (3) has been satisfied for the 1-1/8-10 Stub Acme – 2G external thread of the Transport Bulkhead, p/n 101326653.

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

<u>Type=</u>	Part
<u>Name=</u>	<b>101326741</b>
<u>Revision=</u>	<b>A</b>
<u>Description=</u>	N2 COMPENSATED SAMPLE CHAMBER ASSEMBLY, MCS, RDT-A
<u>Reference Number=</u>	101326741
<u>Lab/Office=</u>	WLD=Houston Wireline Development

### APPROVED BY:

TITLE/ ROLE	PERSON	DATE	ACTION
Design Complete	David Ball	6/23/2003	APPROVED
Procurement or Mfg Approval	Warrene Drew	6/24/2003	APPROVED
Technology Design approval	David Ball	6/23/2003	APPROVED
Pre SAP Checker Approval	Warrene Drew	6/24/2003	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
9999	Engr Drawing	D00104843	A	N2 COMPENSATED SAMPLE CHAMBER ASSEMBLY, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description
0027	Part	101205446	A	3.78357	1.0	N1	SPOOL - FLOWLINE - TRANSPORT CHAMBER - MULTI CHAMBER SECTION - RDT-A
0028	Part	100000197	NX	.25110	1.0	N1	O-RING - 568-110 - FLUOROC - 95 DURO - 3/8 X 9/16 X 3/32

# Production Release

0031	Part	100114893	A	.25322	1.0	N1	O-RING, 568-322, FLUOROCARBON, 95 DURO, 1 1/4 X 1 5/8 X 3/16
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## CURRENT CHANGE DESCRIPTIONS

**Part 101326741 A**  
NONE

**Notes**

**Component List:****Production Release**

Find#	Type	Part/ Matl#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
0001	Part	101207144	101207144		1.0	60TC4C - F250C - 1/4 `` - 60 KPSI - TUBE CAP <b>X14292 AUTOCLAVE ENGINEERS 60TC4C - F250C - WO - 1/4 " - 60 KPSI - TUBE CAP</b>	-	-	-	N
0002	Part	101207147	3.78302	3.78302	1.0	ADAPTER - HIGH PRESSURE - TRANSPORT CHAMBER - MULTI CHAMBER SECTION - RDT-A	-	-	-	N
0003	Part	100136765	3.78330	3.78330	1.0	BULKHEAD, UPPER, TRANSPORT CHAMBER, RDT-A	-	-	-	N
0004	Part	100000199	.25112		4.0	<b>X14460 KNUST - SBS 3.78330</b> O-RING - 568-112 - FLUOROC - 95 DURO - 1/2 X 11/16 X 3/32	-	-	-	N
0005	Part	101006873	3.78328	3.78328	1.0	CYLINDER - 1000 CC - TRANSPORT CHAMBER - RDT-A	-	-	-	N
0006	Part	100136881	3.78899	3.78899	5.0	<b>X14460 KNUST - SBS 3.78328</b> RING, BACKUP, 1.103/1.101 INSIDE DIAMETER X .115/.113 RADIUS WALL X .062/.058 THICK	-	-	-	N
0007	Part	101203791	101203791		3.0	NATIONAL O-RING - NAO 215 V25 VITON 95 O-RING - 568-215 - 95 DURO - 1 1/16 X 1 5/16 X 1/8 - SPEC 770.10598	-	-	-	N
0008	Part	101203659	.14024		1.0	<b>X11896 NATIONAL ORING NAO 215 V25 VITON 95</b> BALL - 0.750 INCH DIAMETER - TEFLON - INDUSTRIAL - VIRGIN - WHITE - EXTRUDED	-	-	-	N
0009	Part	101006874	3.78333	3.78333	1.0	<b>E11588 CADILLAC PLASTIC 332595</b> PISTON, OUTER, TRANSPORT CHAMBER, RDT-A	-	-	-	N
0010	Part	100111153	.07491		4.0	<b>X14460 KNUST - SBS 3.78333</b> T-RING ASSEMBLY, 0.333 BORE X 0.309 GROOVE, PISTON TYPE <b>X12832 GREENE TWEED</b>	-	-	-	B
0011	Part	101006243	3.78906	3.78906	1.0	116215017310451 RETAINER - PILOTED CHECK	-	-	-	N

# Production Release

## Component List:

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
0012	Part	101326655	101326655	D00104838	1.0	PISTON, N2 COMPENSATED SAMPLE - CHAMBER, MCS, RDT-A <b>X14460 KNUST - SBS 101326655 A</b>	-	-	-	N
0013	Part	101202050	.60084		1.0	VALVE - CHECK - CARTIDGE INSERT 1/2 - 3000 PSI - STNLS 303 - 50 PSI CRACKING PRESSURE	-	-	-	N
0014	Part	101204954	101204954		3.0	NATIONAL O-RING - NAO 012 V25 VITON 95 O-RING - 568-012 - 95 DURO - 3/8 X 1/2 X 1/16 - <b>X11896 NATIONAL ORING NAO 012 V25 VITON 95</b>	-	-	-	N
0015	Part	101326654	101326654	D00104837	1.0	SPOOL, PISTON, N2 COMPENSATED CHAMBER, MCS, RDT-A <b>X14460 KNUST - SBS 101326654 A</b>	-	-	-	N
0016	Part	101326656	101326656	D00104840	1.0	PIN, ALIGNMENT, N2 COMPENSATED CHAMBER, MCS, RDT-A <b>X14460 KNUST - SBS 101326656 A</b>	-	-	-	N
0017	Part	100009623	.31792		1.0	PIN - SPIROL - 3/32 X 3/8 - HD - STNLS <b>X14460 KNUST - SBS 101326656 A</b>	-	-	-	N
0018	Part	101332241	101332241		2.0	O-RING, 568-210, 95 DUR-O, 3/4 X 1 X 1/8, NAO 210 V25 VITON 95, NATIONAL O-RING <b>X11896 NATIONAL ORING NATIONA LORING VITON 95</b>	-	-	-	N
0019	Part	101326659	101326659	D00104844	1.0	RING, BACK-UP, .768/.770 ID X .113/.115 RADIAL WALL X .060/.064 THICK, RDT-A <b>X14460 KNUST - SBS 101326651 A</b>	-	-	-	N
0020	Part	101326651	101326651	D00104835	1.0	THREADED INSERT, N2 COMPENSATED CHAMBER, MCS, RDT-A <b>X14460 KNUST - SBS 101326651 A</b>	-	-	-	N
0021	Part	100109176	.01811		1.0	GLAND, 1/4 IN, 60K POUNDS PER SQ IN ANGLE(40), AUTOCLAVE <b>X14460 KNUST - SBS 101326651 A</b>	-	-	-	N

**Component List:****Production Release**

Find#	Type	Part/ Matl#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
						ENGINEERS <b>X14292 AUTOCLAVE ENGINEERS</b>				
0022	Part	101203700	101203700		1.0	<b>AGL(40)</b> PLUG - 1/4 IN - 60 KPSI - AP(40) - AUTOCLAVE ENGINEERS	-	-	-	N
0023	Part	101326653	101326653	D00104836	1.0	<b>X14292 AUTOCLAVE ENGINEERS</b> <b>AP(40)</b> BULKHEAD, TRANSPORT, N2 COMPENSATED CHAMBER, MCS, RDT-A	-	-	-	N
0024	Part	101326658	101326658	D00104841	2.0	<b>X14460 KNUST - SBS 101326653 A</b> RING, BACK-UP, .522/.524 ID X .080/.082 RADIAL WALL X .058/.062 THICK, RDT-A	-	-	-	N
0025	Part	101330722	101330722		1.0	PLUG, 1/4 INCH TUBING, MEDIUM PRESSURE, AUTOCLAVE ENGINEERS, CPX40	-	-	-	N
0026	Part	101006082	.60097		1.0	<b>X14292 AUTOCLAVE ENGINEERS</b> <b>CPX(40)</b> GLAND - 1/4`` TUBING - MEDIUM PRESSURE	-	-	-	N
0029	Part	100000198	.25111		1.0	<b>X14292 AUTOCLAVE ENGINEERS</b> <b>CGLX40</b> O-RING - 568-111 - FLUOROC - 95 DURO - 7/16 X 5/8 X 3/32	-	-	-	N
0030	Part	101006884	3.78504	3.78504	1.0	PLUG, IN/OUT, FLUSHING PUMP SECTION, RDT-A	-	-	-	N
0032	Part	101326652	101326652	D00104833	1.0	BULKHEAD, LOWER, N2 COMPENSATED CHAMBER, MCS, RDT-A	-	-	-	N
0033	Part	101006868	3.78323	3.78323	2.0	<b>X14460 KNUST - SBS 101326652 A</b> SEAT, VALVE, TRANSPORT VALVE, TRANSPORTABLE CHAMBERS, RDT- A	-	-	-	N
0034	Part	101006864	3.78319	3.78319	2.0	<b>X14460 KNUST - SBS 3.78323</b> GUIDE, VALVE STEM, TRANSPORT VALVE, TRANSPORTABLE	-	-	-	N

**Component List:****Production Release**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
0035	Part	101204953	101204953		2.0	X14460 KNUST - SBS 3.78319 NATIONAL O-RING - NAO 008 V25 VITON 95 O-RING - 568-008 - 95 DURO - 3/16 X 5/16 X 1/16 - <b>X11896 NATIONAL ORING NAO 008</b>	-	-	-	N
0036	Part	101006865	3.78320	3.78320	2.0	V25 VTON 95 SEAL, VALVE STEM, TRANSPORT VALVE, TRANSPORTABLE CHAMBER	-	-	-	N
0037	Part	101006867	3.78322	3.78322	2.0	X14460 KNUST - SBS 3.78320 RETAINER, VALVE SEAT, TRANSPORT VALVE, TRANSPORTABLE CHAMBER	-	-	-	N
0038	Part	101006866	3.78321	3.78321	2.0	X14460 KNUST - SBS 3.78322 STEM, VALVE, TRANSPORT VALVE, TRANSPORTABLE CHAMBER	-	-	-	N
<b>X14460 KNUST - SBS 3.78321</b>										

\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

<u>Type=</u>	Part
<u>Name=</u>	<b>101207147</b>
<u>Revision=</u>	C
<u>Description=</u>	ADAPTER - HIGH PRESSURE - TRANSPORT CHAMBER - MULTI CHAMBER SECTION - RDT-A
<u>Reference Number=</u>	3.78302
<u>Lab/Office=</u>	WLD=Houston Wireline Development

### APPROVED BY:

TITLE/ ROLE	PERSON	DATE	ACTION
Design Complete	Michael Escrivá	8/2/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	8/7/2001	APPROVED
Technology Design approval	Michael Escrivá	8/2/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	8/7/2001	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
DWG	Engr Drawing	3.78302	C	ADAPTER - HIGH PRESSURE - TRANSPORT CHAMBER - MULTI CHAMBER SECTION - RDT-A
SPC1	Specification	770.10582	NW	SPEC - METAL - COBALT ALLOY MP35N - ROUND BARS - 210 KSI MINIMUM YIELD STRENGTH - NACE MR-01-75 STANDARD
SPC2	Specification	D00008755	B	SPEC, METAL, NITRONIC 60, 30 % COLD WORKED, 127,000 MINIMUM YIELD

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

### **Part 101207147 C**

3.78302 ; ADD MP35-N MATERIAL AS OPTION IF NITRONIC 60 MATERIAL IS UNAVAILABLE; CHANGE NITRONIC 60 MATERIAL.  
SPECIFICATION FROM D00006935 TO D00008755

### **Engr Drawing 3.78302 C**

ADD NOTE TO ENGINEERING DRAWING ; PERMIT SUBSTITUTION OF MATERIALS IF NITRONIC 60 MATERIAL IS UNAVAILABLE

### **Specification D00008755 B**

Purpose of change is formal check and release of documentation .First release was fast track.

### Notes

**Component List:**

Find#	Type	Part/ Matl#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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**Production Release**

\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENT'S ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED BY HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

Type=	Part
Name=	<b>100136765</b>
Revision=	<b>B</b>
Description=	BULKHEAD, UPPER, TRANSPORT CHAMBER, RDT-A
Reference Number=	3.78330
Lab/Office=	WLD-Houston Wireline Development

APPROVED BY:			
TITLE/ ROLE	PERSON	DATE	ACTION
Design Complete	Michael Escrivá	10/15/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escrivá	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10907	NY	SPEC. METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED
0002	Specification	770.10732	NW	SPEC - COATING - ELECTROLESS CHROME-NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
DWG	Engr Drawing	3.78330	D	BULKHEAD, UPPER, TRANSPORT CHAMBER, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 100136765 B**  
REMOVE MIC FROM SOURCE CONTROL, DRAWING

**Engr Drawing 3.783.30 D**  
REMOVE MIC FROM SOURCE CONTROL, DRAWING

### **Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL - INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC, METAL, INCONEL, 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

### Notes

## Production Release

### Component List:

Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

PIR-100136765-B.mif

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Report Created 07/01/2003 01:21:54 PM

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENTS ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED BY HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

Type=

Part

Name=

101006873

Revision=

B

Description=

CYLINDER - 1000 CC -  
TRANSPORT CHAMBER - RDT-A

Reference Number=

3.78328

Lab/Office=

WLD-Houston Wireline  
Development

APPROVED BY:

TITLE/ROLE

PERSON

DATE

ACTION

Design Complete	Michael Escriva	10/15/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escriva	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10907	NY	SPEC. METAL, INCONEL 718 ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED
DWG	Engr Drawing	3.78328	D	CYLINDER - 1000 CC - DOT TRANSPORT CHAMBER - RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

### CURRENT CHANGE DESCRIPTIONS

# Production Release

## Part 101006873 B

REMOVE MIC FROM SOURCE CONTROL, DRAWING

## Engr Drawing 3.78328 D

REMOVE MIC FROM SOURCE CONTROL, DRAWING;

## Specification 770.10907 NY

NAME CHANGE ONLY: WAS: SPEC - METAL - INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC. METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

## Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

**Production Release**

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENT'S ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED BY HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

Type=

Part

Name=  
**101006874**

Revision=  
**D**

Description=  
PISTON, OUTER, TRANSPORT CHAMBER, RDT-A

Reference Number=  
3.78333

Lab/Office=  
WLD=Houston Wireline Development

APPROVED BY:

TITLE/ ROLE

PERSON

DATE

ACTION

Design Complete	Michael Escriva	10/15/2001	APPROVED
Procurement or Mfg Approval	Warren Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escriva	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10907	NY	SPEC. METAL. INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX. NACE APPROVED
0002	Specification	770.10732	NW	SPEC - COATING - ELECTROLESS CHROME- NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
DWG	Engr Drawing	3.78333	D	PISTON, OUTER, TRANSPORT CHAMBER, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101006874 D**  
REMOVE MIC FROM SOURCE CONTROL DRAWING

**Engr Drawing 3.78333 D**  
REMOVE MIC FROM SOURCE CONTROL DRAWING

**Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL -INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO:  
SPEC, METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD  
STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

## Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

**Production Release**

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENT'S ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED BY HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

<u>Type=</u>	Part	<u>Approved By:</u>		<u>Action</u>
<u>Name=</u>	<b>101006243</b>	<u>Title/ Role</u>	<u>Person</u>	<u>Date</u>
<u>Revision=</u>	<b>A</b>			
<u>Description=</u>	RETAINER - PILOTED CHECK VALVE - RDT-A			
<u>Reference Number=</u>	3.78906			
<u>Lab/Office=</u>	WLD=Houston Wireline Development			

	<u>Approved By:</u>	<u>Title/ Role</u>	<u>Person</u>	<u>Date</u>	<u>Action</u>
		Design Complete	Bobby Middlebrooks	8/16/1999	APPROVED
		Procurement or Mfg Approval	Bobby Middlebrooks	8/16/1999	APPROVED
		Technology Design approval	Bobby Middlebrooks	8/16/1999	APPROVED
		Pre SAP Checker Approval			

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10394	A	SPEC - METAL - BERYLLIUM COPPER ALLOY C17200 - ROUND BARS - AT CONDITION - 140 KSI MINIMUM YIELD STRENGTH
9999	Engr Drawing	3.78906	A	RETAINER - PILOTED CHECK VALVE - RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

### CURRENT CHANGE DESCRIPTIONS

Part **101006243 A**  
PIR-101006243-A.rtf

# Production Release

Move 101006243 to SAP.

## Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

**Production Release**

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENT'S ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED BY HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

Type= Part

Name= 101326655

A

Description= PISTON N2 COMPENSATOR MCS, RDT-A  
SAMPLE CHAMBER

APPROVED BY:

TITLE/ ROLE

PERSON

DATE

ACTION

Design Complete	David Ball	6/3/2003	APPROVED
Procurement or Mfg Approval	Warrene Drew	6/23/2003	APPROVED
Technology Design approval	David Ball	6/3/2003	APPROVED
Pre SAP Checker Approval	Warrene Drew	6/23/2003	APPROVED

Reference Number= 101326655

Lab/Office= WLD-Houston Wireline Development

### Defining Objects:

Find#	Type	Name	Rev	Description
9997	Specification	770.10732	NW	SPEC - COATING - ELECTROLESS CHROME-NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
9998	Specification	770.10907	NY	SPEC. METAL INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX.
9999	Engr Drawing	D00104838	A	NACE APPROVED PISTON, N2 COMPENSATED SAMPLE CHAMBER, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101326655 A**  
NONE

### **Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL - INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC, METAL, INCONEL 718 ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

### **Notes**

Component List:

**Production Release**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	T/C
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

THE INFORMATION CONTAINED HEREON SHALL BE CONSIDERED THE SOLE PROPERTY OF HALLIBURTON ENERGY SERVICES AND THE RECIPIENT THEREOF AGREES NOT TO DISCLOSE SAID INFORMATION TO PARTIES OUTSIDE THE RECIPIENT'S ORGANIZATION AND NOT TO USE OR DUPLICATE SAID INFORMATION FOR ANY PURPOSE EXCEPT AS SPECIFIED IN THE CONTRACTS WITHIN THE HALLIBURTON ENERGY SERVICES WITHOUT THE WRITTEN PERMISSION OF HES.

### Type= Part

Name=	<b>101326654</b>
Revision=	<b>A</b>
Description=	SPOOL, PISTON, N2 COMPENSATED CHAMFER, MCS, RDT-A
Reference Number=	101326654
Lab/Office=	WJD Houston Wireline Development

### APPROVED BY:

TITLE/ROLE	PERSON	DATE	ACTION
Design Complete	David Ball	6/3/2003	APPROVED
Procurement or Mfg Approval	Warrene Drew	6/23/2003	APPROVED
Technology Design approval	David Ball	6/3/2003	APPROVED
Pre SAP Checker Approval	Warrene Drew	6/23/2003	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
0007	Specification	77010304	A	SPEC - METAL - BERYLLIUM COPPER ALLOY C17200 - ROUND BARS - AT CONDITION - 140 KSI MINIMUM YIELD STRENGTH
0008	Part Model	D00104837	A	SPOOL, PISTON, N2 COMPENSATED CHAMFER, MCS, RDT-A
0009	Engr Drawing	D00104837	A	SPOOL, PISTON, N2 COMPENSATED CHAMFER, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

Part 101326654 A  
NONE

Notes

Component List:

**Production Release**

Find <sup>H</sup>	Type	Part/ Mat <sup>H</sup>	Reference <sup>H</sup>	Drawing <sup>H</sup>	Qty	Description	Dim A	Dim B	Dim C	TC
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# Production Release

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Type	Part	APPROVED BY:	TITLE/ ROLE	PERSON	DATE	ACTION
Name=	<b>101326656</b>		Design Complete	David Ball	6/3/2003	APPROVED
Revision=	<b>A</b>		Procurement or Mfg Approval	Warrene Drew	6/23/2003	APPROVED
Description=	PIN, ALIGNMENT, N2 COMPENSATED CHAMBER, MCS. RDT-A	Technology Design approval	David Ball	6/3/2003	APPROVED	
Reference Number=	101326656	Pre SAP Checker Approval	Warrene Drew	6/23/2003	APPROVED	
Lab/Office=	WLD-Houston Wireline Development					

### Defining Objects:

Find#	Type	Name	Rev	Description
9997	Specification	770.10394	A	SPEC - METAL - BERYLLIUM COPPER ALLOY C17200 - ROUND BARS - AT CONDITION - 140 KSI MINIMUM YIELD STRENGTH PIN, ALIGNMENT, N2 COMPENSATED CHAMBER, MCS, RDT-A
9998	Part Model	D00104840	A	
9999	Engr Drawing	D00104840	A	PIN, ALIGNMENT, N2 COMPENSATED CHAMBER, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101326656 A**

NONE

**Notes**

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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**Production Release**

\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

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Type=

Part

Name=

101326651

Revision=

A

Description=

THREADED INSERT, N2 COMPENSATED CHAMFER, MCS.  
RDT-A

APPROVED BY:

TITLE/ROLE	PERSON	DATE	ACTION
Design Complete	David Ball	6/3/2003	APPROVED
Procurement or Mfg Approval	Warrene Drew	6/23/2003	APPROVED
Technology Design approval	David Ball	6/3/2003	APPROVED
Pre SAP Checker Approval	Warrene Drew	6/23/2003	APPROVED

Reference Number=

101326651

Lab/Office=

WLD Houston Wireline Development

Defining Objects:

Find#	Type	Name	Rev	Description
9996	Specification	D00104835	NW	SPEC - COATING - ELECTROLESS CHROME- NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
9997	Specification	D00104835	NY	SPEC. METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED
9998	Part Model	D00104835	A	THREADED INSERT, N2 COMPENSATED CHAMBER, MCS, RDT-A
9999	Engr Drawing	D00104835	A	THREADED INSERT, N2 COMPENSATED CHAMBER, MCS, RDT-A

Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description
PIR-101326651-A.rif							

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101326651 A**

NONE

### **Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL - INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC, METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

### Notes

Component List:

**Production Release**

Find#	Type	Part/ Matl#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	Tc
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

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Type=	Part	APPROVED BY:	TITLE/ ROLE	PERSON	DATE	ACTION
Name=	<b>101326653</b>		Design Complete	David Ball	6/25/2003	APPROVED
Revision=	<b>B</b>		Procurement or Mfg Approval	Warrene Drew	7/3/2003	APPROVED
Description=	BULKHEAD, TRANSPORT, N2 COMPENSATED CHAMBER, MCS, RDT-A	Technology Design approval	David Ball	6/25/2003	APPROVED	
Reference Number=	101326653	Pre SAP Checker Approval	Warrene Drew	7/3/2003	APPROVED	
Lab/Office=	WLD=Houston Wireline Development					

### Defining Objects:

Find#	Type	Name	Rev	Description
9996	Part Model	D00104836	A	BULKHEAD, TRANSPORT, N2 COMPENSATED CHAMBER, MCS, RDT-A
9997	Specification	770.10732	NW	SPEC - COATING - ELECTROLESS CHROME- NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
9999	Engn Drawing	770.10907	NY	SPEC, METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED
		D00104836	B	BULKHEAD, TRANSPORT, N2 COMPENSATED CHAMBER, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

### **Part 101326653 B**

DRAWING CHANGE D00104836 REMOVED GD&T FROM .141 DIAMETER ZONE B6 ADDED DELTA 6 TO .141 DIAMETER ZONE B6 ADDED NOTE DELTA 6 MOVED DETAIL B, SECTION A-A, AND END VIEW UP TO MAKE ROOM FOR NOTE 6

### **Engr Drawing D00104836 B**

DRAWING CHANGE D00104836 REMOVED GD&T FROM .141 DIAMETER ZONE B6 ADDED DELTA 6 TO .141 DIAMETER ZONE B6 ADDED NOTE DELTA 6 MOVED DETAIL B, SECTION A-A, AND END VIEW UP TO MAKE ROOM FOR NOTE 6

### **Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL -INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC, METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

## Notes

# **Production Release**

## **Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

## Halliburton Energy Services Product Information Report

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Type=

Part

Name=

101326652

A

Description=

BULKHEAD, LOWER, N2 COMPENSATED CHAMBER, MCS, RDT-A

Revision=

APPROVED BY:

TITLE/ROLE

PERSON

DATE

ACTION

Design Complete	David Ball	6/3/2003	APPROVED
Procurement or Mfg Approval	Warrene Drew	6/23/2003	APPROVED
Technology Design approval	David Ball	6/3/2003	APPROVED
Pre SAP Checker Approval	Warrene Drew	6/23/2003	APPROVED

Reference Number=

101326652

Lab/Office=

WLD-Houston Wireline Development

### Defining Objects:

Find#	Type	Name	Rev	Description
9996	Specification	770.10732	NW	SPEC - COATING - ELECTROLESS CHROME-NICKEL ALLOY INFUSED WITH FLUOROPOLYMER - NEDOX SF-2 - FERROUS METALS
9997	Specification	770.10907	NY	SPEC. METAL, INCONEL, 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX. NACE APPROVED
9998	Part Model	D00104833	A	BULKHEAD, LOWER, N2 COMPENSATED CHAMBER, MCS, RDT-A
9999	Engr Drawing	D00104833	A	BULKHEAD, LOWER, N2 COMPENSATED CHAMBER, MCS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description
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Report Created 07/02/2003 10:56:18 AM

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101326652 A**

NONE

### **Specification 770.10907 NY**

NAME CHANGE ONLY: WAS: SPEC - METAL - INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC. METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

### Notes

**Component List:**

Find#	Type	Part/ Matl#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

**Production Release**

# Production Release

## Halliburton Energy Services Product Information Report

This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

Type=

Part

**101006868**

**B**

Description=  
SEAT, VALVE, TRANSPORT  
VALVE, TRANSPORTABLE  
CHAMBERS, RDT-A

### APPROVED BY:

	TITLE/ ROLE	PERSON	DATE	ACTION
	Design Complete	Michael Escriva	10/15/2001	APPROVED
	Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
	Technology Design approval	Michael Escriva	10/15/2001	APPROVED
	Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

Reference Number= 3.78323

WLD=Houston Wireline  
Development

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10457	B	SPEC - METAL - PH STAINLESS STEEL - ROUND BARS - 100 KSI MINIMUM YIELD STRENGTH - H2 SERVICE
DWG	Eng Drawing	3.78323	C	SEAT, VALVE, TRANSPORTABLE CHAMBERS, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

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# Production Release

## CURRENT CHANGE DESCRIPTIONS

### **Part 101006868 B**

REMOVE MIC FROM SOURCE CONTROL DRAWING

### **Engr Drawing 3.78323 C**

REMOVE MIC FROM SOURCE CONTROL DRAWING

### Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

**Production Release**

# Production Release

## Halliburton Energy Services Product Information Report

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Type=

Part

**101006864**

**B**

Description=  
GUIDE, VALVE STEM,  
TRANSPORT VALVE,  
TRANSPORTABLE CHAMBER

### APPROVED BY:

#### TITLE/ ROLE

#### PERSON

#### DATE

ACTION			
Design Complete	Michael Escriva	10/15/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escriva	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

Reference Number=

3.78319

Lab/Office=  
WLD=Houston Wireline  
Development

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	70.92629	H	SPECIFICATION - MONEL - K500 - AGE HARDEDEN - CHARPY IMPACT TESTED - FED QQ-N-286
DWG	Engr Drawing	3.78319	C	GUIDE, VALVE STEM, TRANSPORT VALVE, TRANSPORTABLE CHAMBER

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

### **Part 101006864 B**

REMOVE MIC FROM SOURCE CONTROL DRAWING

### **Engr Drawing 3.78319 C**

REMOVE MIC FROM SOURCE CONTROL DRAWING

### Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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**Production Release**

\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

# Production Release

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<u>Type</u> =	Part	<u>Name</u> =	<b>101006865</b>	<u>Revision</u> =	<b>B</b>	<u>Description</u> =	SEAL, VALVE STEM, TRANSPORT VALVE, TRANSPORTABLE CHAMBER
<u>Reference Number</u> =	3.78320	<u>Lab/Office</u> =	WLD=Houston Wireline Development				

### APPROVED BY:

TITLE/ ROLE	PERSON	DATE	ACTION
Design Complete	Michael Escriva	10/15/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escriva	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	70.92629	H	SPECIFICATION - MONEL - K500 - AGE HARDENED - CHARPY IMPACT TESTED - FED QQ-N-286
DWG	Engr Drawing	3.78320	C	SEAL, VALVE STEM, TRANSPORT VALVE, TRANSPORTABLE CHAMBER

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## CURRENT CHANGE DESCRIPTIONS

**Part 101006865 B**  
REMOVE MIC FROM SOURCE CONTROL DRAWING

**Engr Drawing 3.78320 C**  
REMOVE MIC FROM SOURCE CONTROL DRAWING

## Notes

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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**Production Release**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*

## Production Release

Halliburton Energy Services  
Product Information Report

**Product Information Report**  
This report reflects Product Structure for the named Part as it existed in the PDM system on the date and time this Report was created.

<u>Type=</u>	Part
<u>Name=</u>	<b>101006867</b>
<u>Revision=</u>	<b>E</b>
<u>Description=</u>	RETAINER, VALVE SEAT, TRANSPORT VALVE, TRANSPORTABLE CHAMBER
<u>Reference Number=</u>	3.78322
<u>Lab/Office=</u>	WLD=Houston Wireline Development

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APPROVED BY:		PERSON	DATE	ACTION
TITLE/ ROLE				
Design Complete		Michael Escrivá	10/15/2001	APPROVED
Procurement or Mfg Approval		Warrene Drew	10/26/2001	APPROVED
Technology Design approval		Michael Escrivá	10/15/2001	APPROVED
Pre SAP Checker Approval		Warrene Drew	10/26/2001	APPROVED

## Defining Objects:

Find#	Type	Name	Rev	Description
EDDWG	Engr Drawing	3.78322	E	RETAINER, VALVE SEAT, TRANSPORT VALVE, TRANSPORTABLE CHAMBER

## Reference Objects:

Find#	Type	Name	Ref	Reference#	Oty	Ref Type	Description
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## CURRENT CHANGE DESCRIPTIONS

Part 101006867 E

# Production Release

REMOVE MIC FROM SOURCE CONTROL DRAWING

**Engr Drawing 3.78322 E**

REMOVE MIC FROM SOURCE CONTROL DRAWING

**Notes**

**Component List:**

Find#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description	Dim A	Dim B	Dim C	TC	
0001	Part	100020207	57.26071	57.26071	1.0	COBALT ALLOY-RD-CD-MP35N (UNS R30035) VIM VAR- 0.750 IN. TOL. +/- 0.002 IN - WORK STRENGTHENED & CENTERLESS GROUND - AGED PER NACE MR0175(LATEST REVISION) TO 51 HRC MAX & 180 KSI MIN YS - REPORT OTHER TENSILE PROPERTIES FOR INFORMATION ONLY - MTR REQ'D	-	-	-	-	B

**Production Release**

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# Production Release

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Type=

Part

Name=

**101006866**

Revision=

C

Description=  
STEM, VALVE, TRANSPORT  
VALVE, TRANSPORTABLE  
CHAMBER

APPROVED BY:

TITLE/ ROLE

PERSON

DATE

ACTION

Design Complete	Michael Escriva	10/15/2001	APPROVED
Procurement or Mfg Approval	Warrene Drew	10/26/2001	APPROVED
Technology Design approval	Michael Escriva	10/15/2001	APPROVED
Pre SAP Checker Approval	Warrene Drew	10/26/2001	APPROVED

Reference Number=

3.78321

Lab/Office=  
WLD-Houston Wireline  
Development

### Defining Objects:

Find#	Type	Name	Rev	Description
0001	Specification	770.10907	NY	SPEC, METAL, INCONEL 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED
DWG	Engr Drawing	3.78321	E	SIEM, VALVE, TRANSPORTABLE CHAMBER, RDT-A

### Reference Objects:

Find#	Type	Name	Rev	Reference#	Qty	Ref Type	Description

# Production Release

## Part 101006873 B

REMOVE MIC FROM SOURCE CONTROL DRAWING

## Engr Drawing 3.78328 D

REMOVE MIC FROM SOURCE CONTROL DRAWING

## Specification 770.10907 NY

NAME CHANGE ONLY: WAS: SPEC - METAL -INCONEL 718 - ROUND BARS - 120 KSI MINIMUM YIELD - 40 HRC MAX - NACE APPROVED TO: SPEC, METAL, INCONEL, 718, ROUND BARS, 125 KSI MINIMUM YIELD, 40 HRC MAX, NACE APPROVED REASON: TO MATCH YIELD STRENGTH DESCRIPTION TO THE ATTACHED SPECIFICATION DOCUMENT

## Notes

**Component List:**

**Production Release**

Dim#	Type	Part/ Mat'l#	Reference#	Drawing#	Qty	Description
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\*\*\*\*\*END OF DOCUMENT\*\*\*\*\*



# HALLIBURTON

## TECHNOLOGY SPECIFICATION

**PREPARED BY:** M. Escriva'

**DATE:** 06/10/1999

**APPROVED BY:** G. Gilbert

**DATE:** 06/11/1999

### 1.0 PURPOSE:

To provide a specification for procurement of round bars of high strength nickel alloy Inconel 718, solution annealed and age-hardened to 125 ksi minimum yield strength.

### 2.0 SCOPE:

- 2.1 This specification outlines the material requirements for grade 718 (UNS N07718), a precipitation hardenable nickel alloy.
- 2.2 This material is to be certified for sour service according to NACE standard MR-01-75 (latest revision).

### 3.0 APPLICATIONS:

Material covered by this specification is suitable for sample chambers used in Formation Tester.

### 4.0 APPLICABLE DOCUMENTS:

- 4.1 ASTM B637, E8, E10, E18, and E140.
- 4.2 MR-01-75
- 4.3 MIL-H-6875

### 5.0 CHEMICAL ANALYSIS REQUIREMENTS:

Nickel (plus cobalt)	50.00-55.00
Chromium	17.00-21.00
Columbium (plus tantalum)	4.75-5.50
Molybdenum	2.80-3.30
Titanium	0.65-1.15
Aluminum	0.20-0.80
Cobalt	1.00 max.
Carbon	0.08 max.
Manganese	0.35 max.
Silicon	0.35 max.
Phosphorus	0.015 max.
Sulphur	0.015 max.
Boron	0.006 max.
Copper	0.30 max.
Iron	Remainder

PRODUCTS AND TECHNOLOGY DEVELOPED IN THE U.S.A., OR BY CITIZENS OF THE U.S.A. ARE DEEMED TO BE OF U.S. ORIGIN AND THEREBY SUBJECT TO U.S. EXPORT CONTROL LAWS. THE EXPORT OR REEXPORT OF U.S. ORIGIN TECHNOLOGY BY ANY MEANS, INCLUDING DATA TRANSFER IS PROHIBITED EXCEPT IN ACCORDANCE WITH U.S. LAW AND HALLIBURTON POLICY	PRINTED DOCUMENTS ARE UNCONTROLLED
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