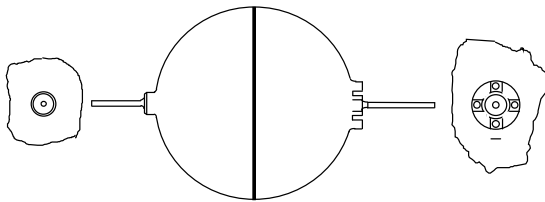


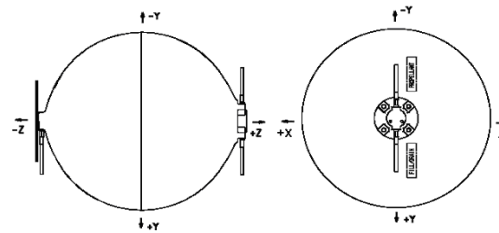
13.33-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|-----------------|-----|----------------|------------------------------------|---------------------------------|------------|------------------------------|---------------------|---|
| 80213-1 | 1974 | 13.33" Ø | 5 | 3.40 | 1232 | 310,550,650 | Classified | Vanes | STA 6Al-4V Ti | The tank is supported by four (4) tapped bosses at the propellant port and by a spring support at the pressurant boss. |
| 80481-1 | 2004 | 13.33" Ø | 1 | 4.08 | 1232 | 300,450,620 | Wild Geese | Sponge | STA 6Al-4V Ti | This tank is a derivative of 80213-1 tank. This Propellant tank is a lightweight spherical titanium bi-propellant fuel tank. The tank is supported by four (4) tapped bosses at the propellant port and by a flex plate attached to three (3) tapped bosses on the pressurant side. |

80213-1



80481-1



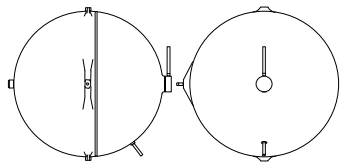
16.5-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|-----------------|-----|----------------|------------------------------------|--------------------------------|-----------------|------------------------------|---------------------|--|
| 80454-1 | 2002 | 16.5" Ø | 2 | 11.4 | 2280 | 300,900,1200 | ORBITAL EXPRESS | Sponge | STA 6Al-4V Ti | This tank is a derivative of 80271-1 tank. Mounting is accomplished by lugs parallel with and adjacent to the mid-plane. Connection is made to the propellant and pressurant compartments through tube stubs with titanium to stainless steel transitions. |

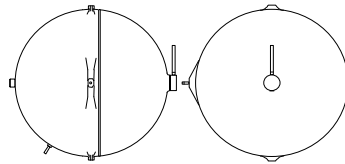
19.03-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|-----------------------------|----------------|-----------------------------------|-----|--|------------------------------------|---------------------------------|---------------------|--|---------------------|--|
| 80296-1, -2, -3 | 1981 | 19.03" Ø, girth bosses (3) or (4) | 14 | 8.0 lbs (-1 & -2), 8.2 lbs (-3) | 3575 | 465,632,815 | SATCOM | Surface tension Propellant management Device (PMD)-vanes | STA 6Al-4V Ti | This tank is the first in a series of 19.03" spherical PMD tanks for the same customer. The PMD concept was supplied to PSI by the customer. The tank shell and the PMD were designed by PSI. This tank was qualified by test. |
| 80304-1, -2, -3, -4, -5, -6 | 1982 thru 1986 | 19.03" Ø, girth bosses (3) or (4) | 57 | 7.75 lbs (-1, -2, -4, -5) 8 lbs (-3, -6) | 3575 | 465,632,815 | G-STAR, DBS, BS-III | Surface tension PMD-vanes | STA 6Al-4V Ti | This tank is a derivative of 80296-1 tank. The tank shell was modified to change the location of the gas port. The PMD remains identical to the 80296 PMD. This tank was qualified by similarity. |
| 80312-1, -2, -3 | 1983 | 19.03" Ø, girth bosses (3) or (4) | 3 | 7.75 lbs (-1, -2) 8 lbs (-3) | 3575 | 415,632,815 | G-STAR DBS | Surface tension PMD-vanes | STA 6Al-4V Ti | This tank is a derivative of 80296-1 tank. This tank is identical to 80304-1 except that vibration testing was added for acceptance. This tank was qualified by similarity. |
| 80353-1 | 1988 | 19.03" Ø, girth bosses (3) | 4 | 8.5 | 3575 | 400,500,600 | Mars Observer | Surface tension PMD-channel and vanes | STA 6Al-4V Ti | This tank is a derivative of 80296-1 tank. The inlet and outlet ports were modified. The PMD was redesigned for the mission. A protoflight test was conducted for this tank. |
| 80480-1 | 2004 | 19.03" Ø, girth bosses | 1 | 7.9 | 3575 | 300,450,815 | Wild Geese | Sponge & Vane | STA 6Al-4V Ti | This is a 19-inch spherical pressure vessel constructed of light-weight titanium. Mounting is accomplished by four (4) tabs parallel with & adjacent to the mid-plane. |

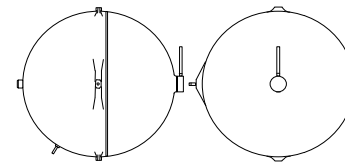
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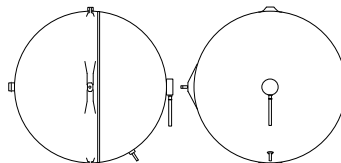
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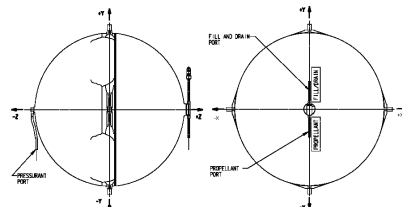
80312-1



80353-1



80480-1

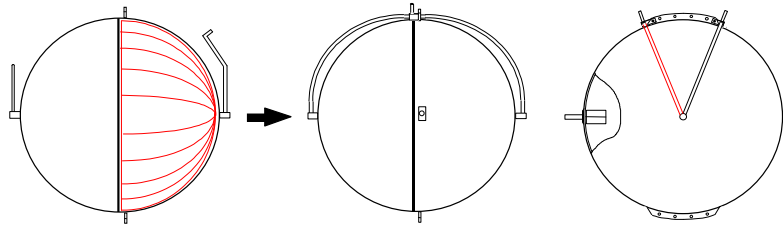


19.06-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|--------------------------|-----|----------------|------------------------------------|---------------------------------|---------|------------------------------|---------------------|--|
| 80379-1 | 1994 | 19.06" Ø, girth lugs (2) | 2 | 10.7 | 3660 | 280,525,754 | NEAR | Vortex Suppressor | STA 6Al-4V Ti | This NEAR oxidizer tank is a derivative of 80274-1. The diaphragm and the diaphragm retaining features were eliminated and an outlet port was added near the girth. A vortex suppressor was added above the outlet port. The inlet and outlet ports were also modified. This tank was qualified by similarity. The development of this tank is detailed in the Reference 3 AIAA paper. |

80274-1

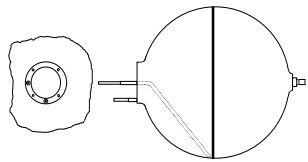
80379-1



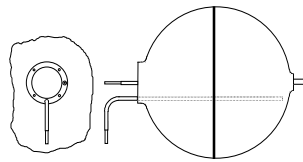
19.32-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|------------------------|-----|----------------|------------------------------------|---------------------------------|-----------------------|-------------------------------|---------------------|---|
| 80182-1 | 1971 thru 1975 | 19.32" Ø, polar bosses | 18 | 11.5 | 3776 | 600,900,1200 | High Energy, Model 35 | None-internal drain tube only | STA 6Al-4V Ti | This tank was developed in 1971. An internal drain tube is installed in the tank. There was no tank-level qualification program. |
| 80209-1 | 1973 | 19.32" Ø, polar bosses | 3 | 11.5 | 3776 | 600,900,1200 | LES | None-internal drain tube only | STA 6Al-4V Ti | This tank is a derivative of 80182-1. The inlet and drain tubes were modified. This tank was qualified by similarity. |
| 80236-1 | 1975 | 19.32" Ø, polar bosses | 2 | 10.68 | 3776 | 540,810,1200 | HEAO-A1 | None | STA 6Al-4V Ti | This tank is a derivative of 80182-1. The inlet and drain tubes were eliminated. This tank was qualified by similarity. |
| 80396-1 | 1995 | 19.32" Ø, polar bosses | 3 | 11.5 | 3776 | 600,900,1200 | Lunar Prospector | Vortex Suppressor | STA 6Al-4V Ti | This tank is a derivative of 80182 and 80379-1. The tank shell was modified to accommodate a vortex suppressor ² . This vortex suppressor is similar to the one developed under the NEAR program, P/N 80379-1. |

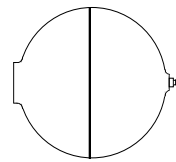
80182-1



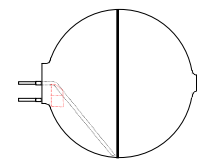
80209-1



80236-1



80396-1



21.3-inch DIAMETER PROPELLANT TANK

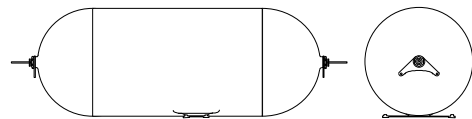
| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|-----------------------|-----|----------------|------------------------------------|--------------------------------|-----------------|------------------------------|---------------------|--|
| 80426-1 | 1999 Thru 2007 | 21.3" Ø x 35.9" long, | 32 | 20 | 9712 | 300,375,450 | STAR 2 BUS | Sponge | STA 6Al-4V Ti | This tank is a derivative of 80394-1 and 80406-1 tanks. Mounting of the tank is provided by two polar brackets and a side mount. |
| 80435-1 | 2000 Thru 2007 | 21.3" Ø x 83.2" long, | 12 | 64.7 | 26345 | 300,375,450 | ASTROLINK, MUOS | Vane, Sponge & Trap | STA 6Al-4V Ti | This NTO Oxidizer tank was designed for the ASTROLINK broadband communication satellites. Mounting is accomplished by a single side plate and provisions for 2 struts each at the pressurant and propellant poles. |

21.75-inch DIAMETER PMD TANK

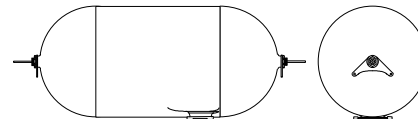
| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------------|----------------|---|-----|----------------|------------------------------------|---------------------------------|--|---|---------------------|--|
| 80390-1 | 1995 thru 1996 | 21.25" Ø x 65.03" long, mounting tab and polar bosses | 12 | 33.5 | 19984 | 300,375,450 | A2100 AX | Surface tension PMD-trap/sponge with screen | STA 6Al-4V Ti | This tank is the first in a series of oxidizer tanks produced for the Lockheed Martin A2100 commercial spacecraft. The customer provided the PMD concept, and PSI designed the tank shell and the PMD. This tank was qualified by test. |
| 80394-1 | 1995 | 21.25" Ø x 47.8" long, mounting tab and polar bosses | 4 | 25.7 | 13979 | 300,375,450 | A2100 A | Surface tension PMD-trap/sponge with screen | STA 6Al-4V Ti | This tank is essentially a shorter version of 80390-1. The tank shell cylinder is 17" shorter than 80390-1 cylinder. The PMD is identical to the 80390-1 PMD. This tank was qualified by test. |
| 80405-1, -101 | 1997 thru 2006 | 21.25" Ø x 65.03" long, mounting tab and polar bosses | 52 | 33.5 | 19984 | 300,375,450 | A2100 AX, SBIRS, AEHF, ECHO, AMC14, JCSAT-12 | Surface tension PMD-trap/sponge with perforated sheet | STA 6Al-4V Ti | This tank is a derivative of 80390-1. The tank shell is nearly identical to the 80390-1 tank shell, and the PMD is similar to the 80390-1 PMD. Two versions are provided: vided or not vided during acceptance testing. This tank was qualified by similarity. |
| 80406-1, -101 | 1997 thru 2007 | 21.25" Ø x 48.08" long, mounting tab and polar bosses | 22 | 25.7 | 13979 | 300,375,450 | A2100 A, AEHF, PAN, BSAT-3B | Surface tension PMD-trap/sponge with perforated sheet | STA 6Al-4V Ti | This tank is a derivative of 80394-1. The tank shell is nearly identical to 80394-1 tank shell, and the PMD is similar to the 80394-1 PMD. Two versions are provided: vided or not vided during acceptance testing. This tank was qualified by similarity. |
| 80504-1 | 2006 | 21.25" Ø x 65.03" long, mounting tab and polar bosses | 2 | 33.5 | 19984 | 300,375,450 | A2100 AX | Surface tension PMD-trap/sponge with perforated sheet | STA 6Al-4V Ti | This tank is a derivative of 80405-1. New flex plate. This tank was qualified by similarity. |

*In production

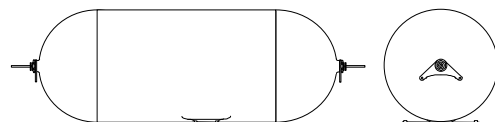
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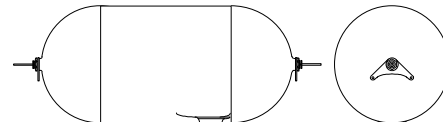
80394-1



80405-1, -101



80406-1, -101

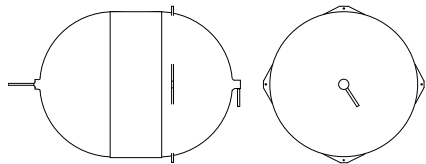


22.1-inch DIAMETER PMD TANK

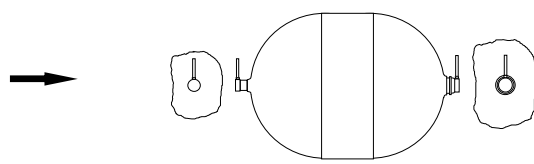
| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|---|-----|----------------|------------------------------------|---------------------------------|------------------------|------------------------------|---------------------|--|
| 80212-1 | 1974 | 22.1" Ø x 32" long, polar bosses and girth lugs (4) | 5 | 23.0 | 9210 | 310,550,620 | Classified | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is the first of a series of vane-PMD propellant tanks. The customer provided the PMD design. This tank was qualified by customer test. |
| 80229-1 | 1975 thru 1978 | 22.1" Ø x 32" long, polar bosses | 13 | 20.0 | 9210 | 310,550,620 | Classified | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is a derivative of 80212-1. The tank shell was modified to eliminate the girth lugs. The PMD remains identical to the 80212 PMD. This tank was qualified by customer test. |
| 80281-1 | 1979 thru 1990 | 22.1" Ø x 32" long, polar bosses | 52 | 20.0 | 9210 | 310,550,636 | Classified | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is a derivative of 80212-1 and 80229-1. The tank shell was slightly modified. The PMD remains identical to the 80212 PMD. This tank was qualified by similarity. |
| 80309-1 | 1982 thru 1989 | 22.1" Ø x 32" long, polar bosses | 7 | 17.8 | 9210 | 318,477,636 | Classified | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is a derivative of 80212-1 and 80229-1. The bosses and tubes were modified. The PMD remains identical to the 80212 PMD. This tank was qualified by similarity. |
| 80313-1 | 1983 thru 1987 | 22.1" Ø, girth lugs (3) | 18 | 12.5 | 5580 | 400,600,800 | SATCOM K, ACTS | Surface tension PMD-vanes | STA 6Al-4V Ti | This tank belongs to the family of 22.12" tank, but it is also a bigger version of the 19.03" PMD propellant. This tank went through a complete qualification program. |
| 80360-1 | 1989 | 22.1" Ø, girth lugs (3) | 12 | 12.5 | 5580 | 400,600,800 | GGs | Perforated sump | STA 6Al-4V Ti | This tank is a derivative of 80313-1. The addition of off-axis bosses required a full qualification program. |
| 80364-1 | 1991 thru 1994 | 22.1" Ø, girth lugs (3) | 20 | 12.5 | 5580 | 400,600,800 | InMarSat-3, InMarSat-5 | Surface tension PMD-vanes | STA 6Al-4V Ti | This tank is a derivative of 80313-1. The PMD remains identical to the 80313-1 PMD. The tank was qualified by similarity. |
| 80420-1 | 1999 Thru 2001 | 22.1" Ø x 32" long, polar bosses | 6 | 17.8 | 9210 | 318,477,636 | BSAT-2 | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is a derivative of 80281-1. The tank shell was modified at the bosses, and a new PMD was designed for the BSAT-2 mission. This tank is still in development stage. |
| 80423-1 | 1999 Thru 2001 | 22.1" Ø x 32" long, polar bosses | 6 | 17.8 | 9210 | 318,477,636 | BSAT-2 | Surface tension PMD-vanes | Annealed 6Al-4V Ti | This tank is a derivative of 80420-1. The tank shell was modified at the bosses, and a new PMD was designed for the BSAT-2 mission. This tank is still in development stage. |
| 80433-1 | 2000 | 22.1" Ø x 39.1" long, polar bosses | 4 | 20 | 12150 | 325,406,488 | MESSENGER | Surface tension PMD-vanes | STA 6Al-4V Ti | Fluid connection is by two titanium tubes welded to the two ports on the polar bosses. Has internal baffles & vortex suppressor. |

*In production

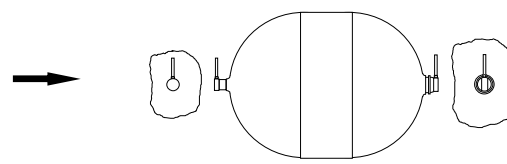
80212-1



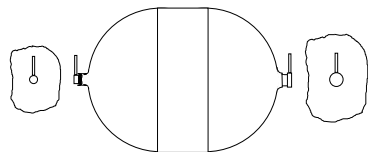
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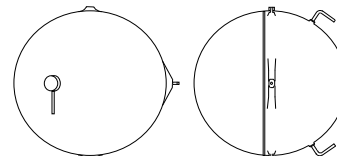
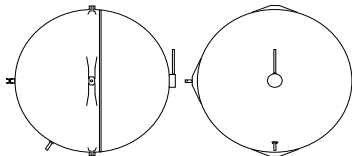
80281-1



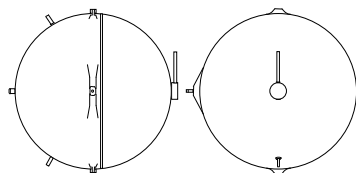
80309-1 80313-1



80360-1



80364-1



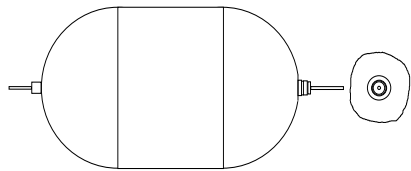
22.2-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|------------------------------------|-----|----------------|------------------------------------|--------------------------------|---------|------------------------------|---------------------|---|
| 80387-1 | 1995 thru 2004 | 22.2" Ø x 29.5" long, polar bosses | 15 | 20 | 7700 | 400,600,800 | P-81 | Vanes, 8 each | STA 6Al-4V Ti | The tank has two heads which are welded to a cylindrical center section. The tank contains an internally mounted propellant management device whose function is to maintain separation of liquid propellant (Hydrazine) & gaseous pressurant & to provide gas free liquid propellant at the tank outlet. Mounting is by the two polar bosses. |

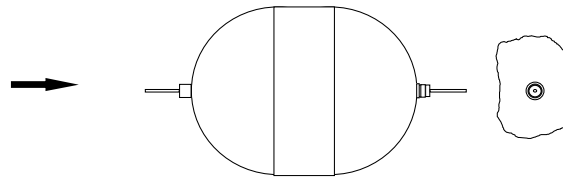
23-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|--------------------------------|-----|----------------|------------------------------------|---------------------------------|------------------|---|---------------------|---|
| 80310-1 | 1983 | 23" Ø x 40" long, polar bosses | 2 | 33.95 | 13743 | 255,400,520 | EUROSTAR | Surface tension PMD-vanes, trap, and sponge | STA 6Al-4V Ti | This tank was for a European program. The PMD concept was provided by the customer. PSI designed the complete tank assembly. The tank was subjected to a complete qualification test program. |
| 80334-1 | 1985 | 23" Ø x 33" long, polar bosses | 16 | 28.41 | 10679 | 255,400,520 | Compact Eurostar | Surface tension PMD-vanes, trap, and sponge | STA 6Al-4V Ti | This tank is a derivative of 80310-1. It has the same PMD as 80310-1. The only differences are a shorter cylinder and PMD vanes. This tank was qualified based upon similarity. |

80310-1



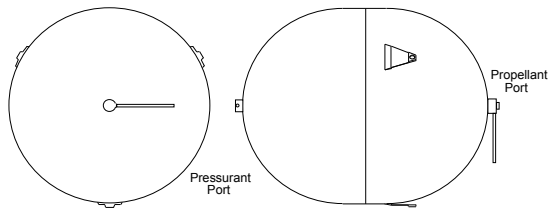
80334-1



24.6-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|--------------------|-----|----------------|------------------------------------|--------------------------------|-----------|------------------------------|---------------------|--|
| 80375-1 | 1993 Thru 1999 | 24.6" Ø x 29" long | 103 | 19 | 9850 | 420,630,840 | IRIDIUM | Vanes | STA 6Al-4V Ti | This tank assembly is a pressure vessel with hemispherical ends & a cylindrical section of all welded construction. The cylindrical section is formed from an extension of the tank ends. It's mounted by 3 equally spaced circumferential tabs with threaded holes located on 1 of the hemispheres near the girth weld joint. |
| 80424-1 | 1999 | 24.6" Ø x 29" long | 1 | 19 | 9850 | 420,630,840 | RADARSAT, | Vanes | STA 6Al-4V Ti | This tank is a derivative of 80375-1 tank . This tank assembly is a pressure vessel with hemispherical ends & a cylindrical section of all welded construction. The cylindrical section is formed from an extension of the tank ends. It's mounted by 3 equally spaced circumferential tabs with threaded holes located on 1 of the hemispheres near the girth weld joint. |
| 80462-1 | 2003 | 24.6" Ø x 29" long | 1 | 22 | 9850 | 420,630,840 | NFIRE | Vanes | STA 6Al-4V Ti | This tank is a derivative of 80375-1 tank. This tank assembly is a pressure vessel with hemispherical ends & a cylindrical section of all welded construction. The cylindrical section is an extension of the tank ends. The tank is mounted using 3 equally spaced circumferential tabs with threaded holes located on 1 of the hemispheres near the girth weld joint. |

80375-1



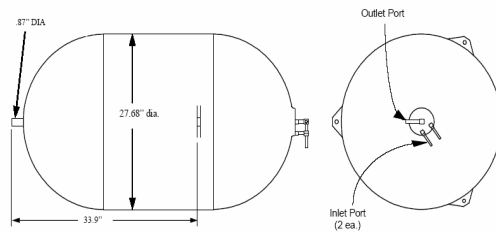
27-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|-----------------|-----|----------------|------------------------------------|--------------------------------|---------|------------------------------|---------------------|------------------------|
| 80506-7 | 2007 | 27" x 56.14" | 4 | 59.45 | 36,300 | 256, 338, 410 | 702B | | STA 6Al-4V Ti | |

27.7-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|--------------------|-----|----------------|------------------------------------|---------------------------------|------------|------------------------------|---------------------|---|
| 80317-1 | 1983 thru 1989 | 27.7" Ø x 49" long | 5 | 60 | 23400 | 350,535,737 | Classified | Trap | STA 6Al-4V Ti | This titanium pressure vessel, with three ports at the polar boss of the ported hemisphere, and mounted by three radial lugs on the cylinder near the weld to the ported hemisphere, and a polar boss on the blind hemisphere. A pair of screen type of surface tension devices, secured to the cylindrical section, is used for propellant gathering during service. |

PSI P/N 80317-105



28-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|--------------------|-----|----------------|------------------------------------|--------------------------------|---------|------------------------------|---------------------|---|
| 80356-1 | 1988 | 28" Ø x 48.5" long | 7 | 60 | 26750 | 325,439,488 | 8482 | Vane | STA 6Al-4V Ti | This pressure vessel with ellipsoidal heads is constructed of 6AL-4V titanium. Fuel expulsion is provided by a vane type propellant management device (PMD) fabricated to provide expulsion capability during low or zero gravity conditions. |

28.5-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|----------------|----------------|----------------------------|------------|-----------------------|---|---------------------------------------|----------------|-------------------------------------|----------------------------|---|
| 80398-1 | 1996 thru 2004 | 28.5" Ø x 54.9" long | 25 | 50 | 26750 | 350,468,525 | SPS-95 | Complex Channel | STA 6Al-4V Ti | This tank assembly is a hemispherical pressure vessel with a cylindrical section & is of all welded construction. It is mounted by a six threaded hole pattern machined into the polar boss end of each hemisphere. |

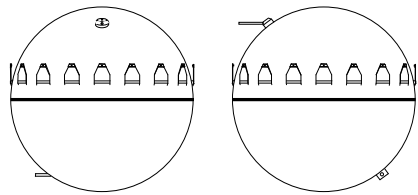
31-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|-----------------|-----|----------------|------------------------------------|--------------------------------|---------|------------------------------|---------------------|---|
| 80339-1 | 1987 | 31.06" Ø | 17 | 30 | 15598 | 300,385,460 | S-5000 | Vane & Trap | STA 6Al-4V Ti | A vane & trap type propellant management device (PMD) is provided to expel fuel under low or zero gravity conditions. Mounting is accomplished by polar bosses. |

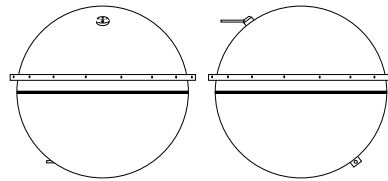
32.84-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|-------------------------------|-----|----------------|------------------------------------|---------------------------------|------------|-----------------------------------|---------------------|---|
| 80277-1 | 1979 thru 1983 | 32.84" Ø, girth tabs (16) | 7 | 32.6 | 18500 | 250,500,1000 | INSAT | Surface tension PMD-vane & sponge | STA 6Al-4V Ti | This tank is the first tank designed to have tab mounts. The customer supplied the PMD concept, and PSI designed the PMD and the tank shell. This tank was qualified by test. |
| 80283-1 | 1979 | 32.84" Ø, girth flange | 1 | 32.6 | 18500 | 250,500,1000 | Classified | Surface tension PMD-vane & sponge | STA 6Al-4V Ti | This tank is a derivative of 80277-1. The tank mounting was changed from tabs to a continuous flange, but the off-axis bosses remained the same. The PMD remains identical to the 80277-1 PMD. This tank was qualified by similarity. |
| 80324-1 | 1984 thru 1996 | 32.84" Ø, polar bosses & lugs | 15 | 44.5 | 18390 | 400,600,800 | MILSTAR | -Galleries & Trap | STA 6Al-4V Ti | Mounting is accomplished on polar bosses & lugs parallel with & adjacent to the mid-plane. |

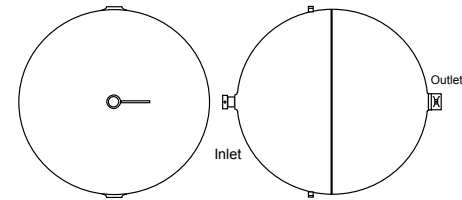
80277-1



80283-1



80324-1



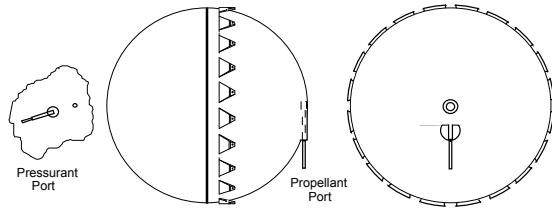
34-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|---------------------|-----|----------------|------------------------------------|--------------------------------|------------------------|------------------------------|---------------------|---|
| 80373-1 | 1993 thru 1994 | 34" Ø, polar bosses | 37 | 30.5 | 20580 | 300,375,450 | S7000, INTELSAT, A2100 | Vane, Channel Trap, Screen | STA 6Al-4V Ti | Fuel (Hydrazine) expulsion is provided by a complex vane, channel & trap type propellant management device (PMD) fabricated to provide expulsion capability under low or zero gravity conditions. |

34.2-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|-----------------------|-----|----------------|------------------------------------|---------------------------------|-------------------|------------------------------|---------------------|--|
| 80301-1 | 1981 thru 1985 | 34.2" Ø, polar bosses | 9 | 34 | 20900 | 255,385,510 | ARABSAT, INSAT-1D | Vane, Cylinder Trap | STA 6Al-4V Ti | The tank assembly is a hemispherical pressure vessel of all welded construction. It is mounted by 20 circumferential tabs with nut plates located on one of the hemispheres near the girth weld joint. |

80301-1



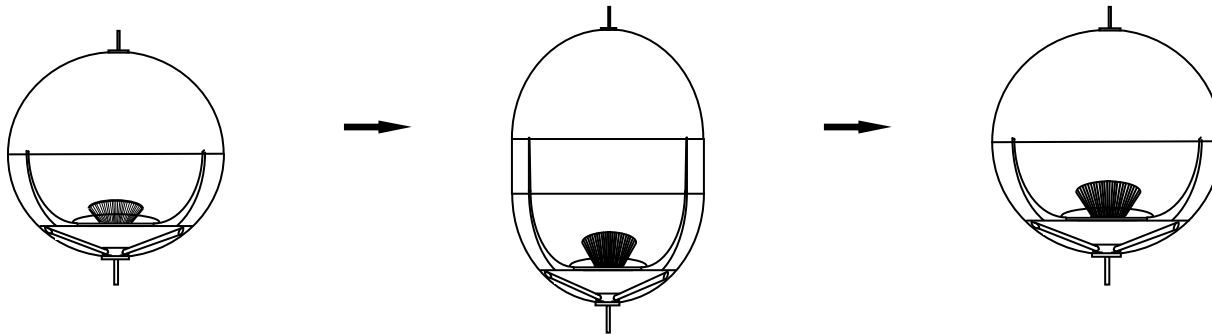
35.1-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|----------------------------------|-----|----------------|------------------------------------|---------------------------------|-----------------|---|---------------------|--|
| 80350-1 | 1988 thru 1997 | 35.1" Ø, polar bosses | 209 | 28.9 | 22450 | 260,325,390 | HS 601 | Surface tension PMD-vanes, trap, sponge | STA 6Al-4V Ti | This tank was designed to support the 3-axis body-stabilized HS 601 spacecraft. The tank shell and the mounting bosses were designed for weight reduction. Qualification was by qualification testing. This tank was designed to carry both monomethylhydrazine fuel and nitrogen tetroxide oxidizer. The development of this tank is detailed in the Reference 5 AIAA paper. |
| 80399-1 | 1996 thru 1997 | 35.1" Ø x 46" long, polar bosses | 22 | 41.0 | 32610 | 260,325,390 | HS 601 Block II | Surface tension PMD-vanes, trap, sponge | STA 6Al-4V Ti | This tank is a derivative of the 80350-1 tank. This tank uses the existing 80350-1 tank shell design and inserts a cylindrical center between the two hemispheres for additional propellant volume. The PMD was modified to adapt to the added central cylinder and a 10% increase in propellant flow rate. Because of the added cylinder, this tank was qualification tested. The development of this tank is detailed in the Reference 6 AIAA paper. |
| 80415-1 | 1998 Thru 2003 | 35.1" Ø, polar bosses | 24 | 29.3 | 22450 | 260,325,390 | HS 601 | Surface tension PMD-vanes, trap, sponge | STA 6Al-4V Ti | This tank is a derivative of both the 80350-1 and 80399-1 tank. This tank combines the 80350-1 tank spherical shell with the 80399-1 PMD to take advantage of the higher flow rate. Qualification was by similarity to the 80350-1 tank shell. |

P/N 80350-1

P/N 80399-1

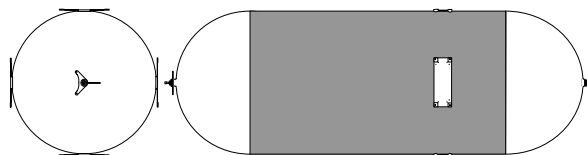
P/N 80415-1



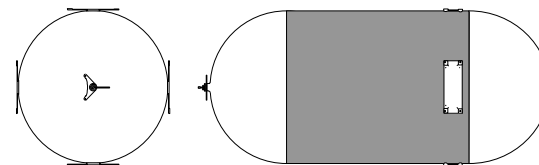
35.5-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------------|----------------|------------------------------------|-----|----------------|------------------------------------|---------------------------------|--------------------------------------|------------------------------|--|--|
| 80391-1, -101 | 1995 thru 2006 | 35.1" Ø x 109" long, polar bosses | 31 | 120 | 92247 | 300,375,450 | A2100 FUEL AX, JCSAT, AMC14, BSAT-3A | Surface tension PMD - vanes | STA 6Al-4V Ti heads, annealed 6Al-4V Ti cylinder, T-1000 carbon fiber overwrap | This unique tank has two STA 6Al-4V Titanium heads and a cylinder made from seam-welded 6Al-4V Titanium sheet. Composite overwrap is applied over the cylinder section for strength and stiffness. This hybrid metal-composite design also includes bonded-on mounting plates. The tank contains a vane-type PMD that runs the entire length of the tanks. Two versions of this tank are provided: vibed or not vibed during vibration testing. This tank was qualified by test. |
| 80395-1, -101 | 1997 thru 2007 | 35.1" Ø x 80.5" long, polar bosses | 13 | 93.2 | 64515 | 300,375,450 | A2100 A, Fuel | Surface tension PMD - vanes | STA 6Al-4V Ti heads, annealed 6Al-4V Ti cylinder, T-1000 carbon fiber overwrap | This tank is essentially a short version of 80391-1. The tank shell construction is identical to 80391-1, except the cylindrical section is shorter. The vane-type PMD is also identical in design, except shorter. This tank was qualified by similarity. Two versions of this tank are provided: vibed or not vibed during acceptance testing. A QBS report was generated. |
| 80432-1, -101 | 1999 | 35.5" Ø x 69.2" long | 6 | 63.75 | 52335 | 300,375,450 | STAR 2 BUS | Vanes, Trap & Sponge | STA 6Al-4V Ti | Mounting of the tank is provided by a carbon/cyanate ester composite skirt with 12 attach points around the cylinder, and a polar plate at the pressurant end. |
| 80443-1 | 2001 | 35.5" Ø x 100.6" long | 3 | 110.9 | 86050 | 285,375,450 | SBIRS GEO 3 | Vanes | STA 6Al-4V Ti | The tank is a carbon overwrapped titanium tank with a polar mounted vane propellant management device. |
| 80476-1 | 2004 Thru 2007 | 35.5" Ø x 71" long | 10 | 63.75 | 52335 | 300,375,450 | STAR 2.4, OPTUS | Vanes, Trap & Sponge | STA 6Al-4V Ti | This tank is a derivative of 80432-1 tank. Mounting of the tank is provided by a carbon/cyanate ester composite skirt with 12 attach points around the cylinder, and a polar flex plate at the pressurant end. |
| 80503-1 | 2006 | 35.1" Ø x 80.5" long, polar bosses | 1 | 93.2 | 64515 | 300,375,450 | A2100 A, Fuel | Surface tension PMD - vanes | STA 6Al-4V Ti | This tank is essentially an 80395-1 with a new flex-plate |
| 80518-1 | 1999 | 35.5" Ø x 69.2" long | 6 | 63.75 | 52,335 | 300,375,450 | STAR2 BUS | Vanes, Trap & Sponge | STA 6Al-4V Ti | This tank is a 80432-101 tank with new flex plate. Tank was qualified by similarity. |

P/N 80391-1, -101



P/N 80395-1, -101



35.6-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|-----------------------|-----|----------------|------------------------------------|--------------------------------|------------------------|------------------------------|---------------------|--|
| 80434-1 | 2000 Thru 2007 | 35.6" Ø x 133.9" long | 6 | 208 | 117154 | 300,375,450 | ASTROLINK | Vane, Sponge & Trap | STA 6Al-4V Ti | This Hydrazine tank was designed for the ASTROLINK broadband communication satellites. Mounting is accomplished by four circumferentially mounted plates / sidemounts and provisions for 2 struts at the pressurant end. |
| 80471-1 | 2000 Thru 2007 | 35.6" Ø x 133.9" long | 6 | 208 | 117154 | 300,375,450 | SBIRS, ASTROLINK, MUOS | Vane, Sponge & Trap | STA 6Al-4V Ti | This tank is a derivative of the 80434-1 tank. The center section of the tank shell is overwrapped with a graphite epoxy composite . Mounting is accomplished by four circumferentially mounted plates / sidemounts and provisions for 2 struts at the pressurant end. |
| 80491-1 | 2000 Thru 2007 | 35.6" Ø x 133.9" long | 6 | 208 | 117154 | 300,375,450 | A2100, ASTROLINK, MUOS | Vane, Sponge & Trap | STA 6Al-4V Ti | This tank is a derivative of the 80434-1 tank. |

38.9-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|----------------|-------------|----------------------------|------------|-----------------------|---|---------------------------------------|----------------|-------------------------------------|----------------------------|--|
| 80340-1 | 1987 | 38.9" Ø | 5 | 37.8 | 30728 | 276,355,424 | S5000 | Vane & Trap | STA 6Al-4V Ti | Mounting is accomplished by a continuous flange parallel with and adjacent to the mid-plane. |

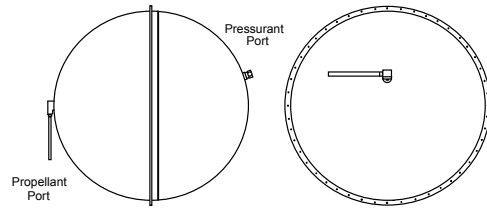
40.5-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|----------------------|-----|----------------|------------------------------------|--------------------------------|--------------|------------------------------|---------------------|---|
| 80338-1 | 1986 | 40.5" Ø Sphere | 11 | 56 | 34500 | 250,375,500 | GOES | Channel | STA 6Al-4V Ti | This tank assembly is a hemispherical pressure vessel of all welded construction. It is mounted by 24 circumferential tabs with nut plates located on one of the hemispheres near the girth weld joint. |
| 80430-1 | 1999 Thru 2006 | 40.5" Ø Sphere | 12 | 48 | 34481 | 330,413,495 | Standard LEO | Vane & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80338-1 tank. Mounting is accomplished by a skirt of 24 circumferential tabs with nut plates located near the girth weld. |
| 80466-1 | 2003 | 40.5" Ø Sphere | 1 | 48 | 34481 | 330,413,495 | GLAST | Vane & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80430-1 tank. Mounting is accomplished by a skirt of 24 circumferential tabs with nut plates located near the girth weld. |
| 80470-1 | 1999 Thru 2006 | 40.5" Ø x 48.8" long | 12 | 60 | 45161 | 340,413,524 | Standard LEO | Vane & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80430-1 tank. Mounting is accomplished by a skirt of 24 circumferential tabs with nut plates located near the girth weld. |
| 80511-1 | 2007 | 40.5" | 2 | 55 | 19992 | 330, 413, 495 | Standard LEO | Vane & Sponge | STA 6Al-4V Ti | Elliptical Pressure vessel |

42-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|-----------------|-----|----------------|------------------------------------|---------------------------------|--------------------|------------------------------|---------------------|--|
| 80352-1 | 1988 Thru 1994 | 42" Ø Sphere | 15 | 51.5 | 39440 | 300,375,450 | MO, S7000, TELSTAR | Channel | STA 6Al-4V Ti | A channel type propellant management device (PMD) is provided to expel NTO under low or zero gravity conditions. Mounting is accomplished by a continuous flange parallel with and adjacent to the mid-plane. |
| 80484-1 | 2004 | 42" Ø Sphere | 2 | 51.5 | 39440 | 300,375,450 | SDO | Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80352-1 tank. A sponge type propellant management device (PMD) is provided to expel NTO under low or zero gravity conditions. Mounting is accomplished by a continuous flange parallel with |

PSI P/N 80352-1



46-inch DIAMETER PROPELLANT TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP,Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|------|--------------------|-----|----------------|------------------------------------|--------------------------------|------------|------------------------------|---------------------|-----------------------------|
| 80507-7 | 2007 | 45.5" 60" Tab Ring | 1 | 96.60 | 76525 | 260,325 390, | 702B | Vane , Sponge | STA 6Al-4V Ti | Tank was qualified by test. |
| 80520-1 | 2008 | 45.5" 61" Tab Ring | 3 | 136 | 76525 | 350, 437, 700 | Classified | Sponge , Gallery Arm | STA 6Al-4V Ti | Tank was qualified by test. |

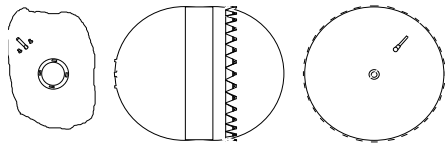
48.9-inch DIAMETER PMD TANK

| PSI P/N | Year | Size & Mounting | Qty | Design Wt (lb) | Internal Volume (in ³) | MEOP, Proof, Burst Press. (psi) | Program | Propellant Management Device | Tank Shell Material | Heritage/History/Usage |
|---------|----------------|----------------------------------|-----|----------------|------------------------------------|---------------------------------|----------------|---|---------------------|---|
| 80363-1 | 1991 | 48.9" Ø x 59.7" long, girth tabs | 4 | 93.5 | 77800 | 250,313,375 | INTELSAT 7A | Surface tension PMD – trap, gallery with titanium screen | STA 6Al-4V Ti | The development of this tank is detailed in the Reference 7 AIAA paper. This tank was qualified by test. |
| 80366-1 | 1992 | 48.9" Ø, girth tabs | 7 | 73.2 | 61028 | 250,313,375 | N-Star | Surface tension PMD – trap, gallery | STA 6Al-4V Ti | This tank is a derivative of the 80363-1 & 80367-1 with the cylinder removed and wall thickness reduced because of the lower loads. The PMD is the same as the I-7A PMD, except shorter. This tank was qualified by test. |
| 80367-1 | 1991 | 48.9" Ø x 59.7" long, girth tabs | 4 | 93.5 | 77800 | 250,313,375 | INTELSAT 7A | Surface tension PMD – trap, gallery with stainless screen | STA 6Al-4V Ti | The development of this tank is detailed in the Reference 7 AIAA paper. This tank was qualified by test. |
| 80380-1 | 1993 Thru 1997 | 48.9" Ø, girth tabs | 46 | 70.0 | 61028 | 250,313,375 | TEMPO | Surface tension PMD – sponge & vanes | STA 6Al-4V Ti | This tank is a derivative of 80366-1. The tank shell is the same but the PMD was re-designed. The development of this tank is detailed in the Reference 8 AIAA paper. This tank was qualified by test. |
| 80403-1 | 1996 thru 2000 | 48.9" Ø x 57.8" long, girth tabs | 32 | 87.6 | 77805 | 250,313,375 | EXTENDED TEMPO | Surface tension PMD – sponge & vanes | STA 6Al-4V Ti | This tank is a derivative of the 80380-1 with an added cylinder and increased wall thickness because of higher loads. The PMD is the same except for longer vanes. This tank was qualified based upon similarity. |
| 80411-1 | 1999* | 48.9" Ø x 63.3" long, girth tabs | 3 | 99.2 | 87575 | 250,313,375 | ETS 8 | Surface tension PMD – trap, sponge & vanes | STA 6Al-4V Ti | This tank is a derivative of the 80363-1, 80367-1, and 80403-1 except the cylinder is longer. The ports are relocated and the PMD is redesigned to meet new mission requirements. This tank will be qualification tested. |
| 80422-1 | 1997 | 48.9" Ø x 57.8" long, girth tabs | 2 | 90.4 | 77805 | 250,313,375 | | Vane, Trap, Screen & Sponge | STA 6Al-4V Ti | The Extended Tank Assembly is a hemispherical pressure vessel with a cylindrical section of all welded construction. It is mounted by 32 circumferential tabs with nut plates located at on one of the hemispheres near the girth weld joint. |
| 80441-1 | 2000 Thru 2007 | 48.9" Ø x 57.8" long, girth tabs | 34 | 91 | 77805 | 250,320,375 | TEMPO | Complex | STA 6Al-4V Ti | The Tank Assembly is a hemispherical pressure vessel with a cylindrical section of all welded construction. It is mounted by 32 circumferential tabs with nut plates located on one of the hemispheres near the girth weld joint. |
| 80442-1 | 2000 Thru 2007 | 48.9" Ø x 63.3" long, girth tabs | 36 | 101 | 87575 | 250,313,375 | TEMPO | Complex | STA 6Al-4V Ti | The Tank Assembly is a hemispherical pressure vessel with a cylindrical section of all welded construction. It is mounted by 32 circumferential tabs with nut plates located on one of the hemispheres near the girth weld joint. |
| 80456-1 | 2002 | 48.9" Ø x 63.3" long, girth tabs | 1 | 99.2 | 87575 | 250,313,375 | MRO | Vane, Trap & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80403-1 and 80411-1 tanks. This tank assembly is a pressure vessel with hemispherical ends & a cylindrical section of all welded construction. It is mounted by 32 circumferential tabs with nut plates located on one of the hemispheres near the cylindrical section weld joint. |

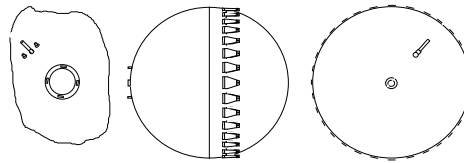
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|---------|----------------------|--|---|------|--------|-----------------|-----------------------------|---------------------|------------------|---|
| 80482-1 | 2006 Thru 2007 | 48.9" \varnothing x 63.3" long, girth tabs | 6 | 99.2 | 87575 | 250,313,375 | DS2000. QUAZI- ZENITH | Vane, Trap & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80411-1 tank with 80442-1 PMD. This tank assembly is a pressure vessel with hemispherical ends & a cylindrical section of all welded construction. It is mounted by 32 circumferential tabs with nut plates located on one of the hemispheres near the cylindrical section weld joint. |
| 80501-1 | 2005 | 48.9" \varnothing x 57.8" long, girth tabs | 2 | 87.6 | 77805 | 250,313,375 | TEMPO | Vane, Trap & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80441-1 & 80442-1 heads. This tank assembly is a hemispherical pressure vessel. It is mounted by 32 circumferential tabs with nut plates located on one of the hemispheres near the girth weld joint. |
| 80502-1 | 2005 | 48.9" \varnothing | 2 | 70 | 61025 | 250,313,375 | TEMPO | Vane, Trap & Sponge | STA 6Al-4V Ti | This tank is a derivative of the 80380-1 shell. The tank contains an internally-mounted propellant management device (PMD), with perforated sheet & woven screen, fabricated to maintain separation of liquid propellant expulsion from the tank under low or zero gravity conditions. |
| 80517-1 | 2011 | 48.9" x 72.3 Tab Ring | | 130 | 103700 | 250, 312.5, 375 | LS1300 | Vane, Trap & Sponge | STA 6Al-4V Ti | A full qual program was conducted. |

*In production

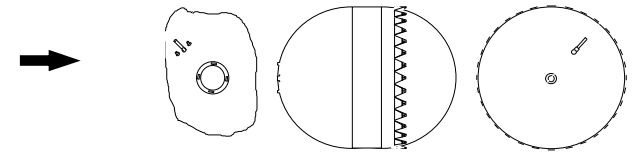
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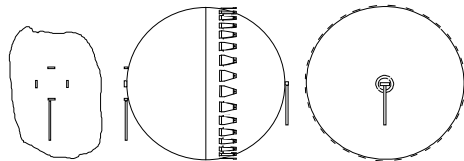
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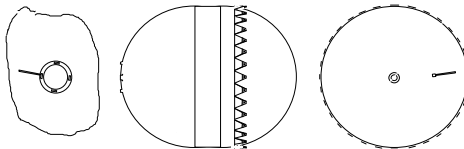
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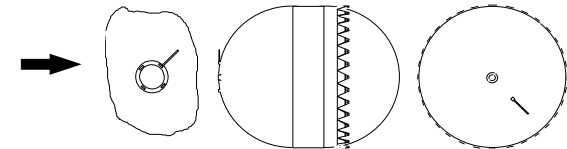
80380-1



80403-1



80411-1



80422-1

