

Integral Fuel Tank Maintenance And Leak Detection

General

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
- Sealants used for permanent repairs are either curing or not-curing type. Structural adhesives are used during the manufacturing process and are not generally considered a viable repair method. Sealants used to repair aircraft require proper storage, packing, mixing application and inspections.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
- Storage of Sealants, Un-Mixed Sealants.
- Unmixed sealants shall be stored in accordance with the manufacturers instructions. If manufacturer's instructions are not available the following general requirements shall apply.
- Unmixed sealants shall not be stored at temperatures above 80 deg. F. Higher temperatures reduce storage duration.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
- Prior to expiration of the shelf life sealants shall be examined and tested for shelf life extension.
- Storage of Sealants, Mixed Sealants
- Freezing. Some multiple part sealants may be premixed and frozen for use at a later time. Manufacturer's instructions should provide guidance as to whether a product can be premixed and frozen. Mixed sealants shall be placed in a clean airtight cartridge that has both ends capped. A container of dry ice and isobutyl or isopropyl alcohol may be used to quick freeze the sealant. A temperature of minus 100 deg. F. shall be maintained in the container. The cartridge shall be immersed nozzle end first to a depth that will cover all the cartridge except one inch. Allow five minutes for freezing. Then place the cartridge in a freezer and store at a minus 20 deg. F. or lower. Cartridges should be labeled with the following information. Manufacturer's name. Specification, date frozen, and batch number.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Mixing of Curing Type Sealants.

- Sealants shall be mixed in accordance with the manufacturer's instructions. When multiple part curing type sealant is prepared for use the accelerator shall be mixed as appropriate to obtain a thorough and complete mixture. Do not attempt to mix a partial kit without using an accurate scale to obtain proper proportioning of contents. Any sealant or accelerator found to be hard or lumpy shall be discarded. Filletting type sealants shall be machine mixed to avoid entrapment of air. Hand mixing is permitted if done in accordance with the manufacturer's instructions. Brushable type sealants may be hand mixed but machine mixing is preferred for large quantities. Hand mixing should be accomplished on a flat plate to avoid trapping air.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Application Life of Sealant.

- Non-curing sealants have an unlimited application life. Curing type sealants have an application life or time during which the sealant remains suitable for use. Application time for multiple part sealants is the time that the mixed sealant remains suitable for application with a brush, injection gun or extrusion gun. Application life is based on standard conditions of 70 deg. F. and 50 percent relative humidity. Temperature and application life have an inverse relationship.
- Sealant shall not be used, regardless of time, when it will no longer readily wets the surface to which is being applied or is beyond its established application life.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Tack-Free Time

- The tack-free time of a sealant is the time required for a sealant to cure to the point at which the outer surface will not stick to a plastic film. The tack free condition can be tested by either touching a piece of plastic or a sealing gun nozzle to the sealant. If no sealant transfers, the sealant is tack-free. Fuel Tanks shall not be filled until sealant is tack-free.

- Sealant Cure

- Curing type sealants require that applied material cure for a specified time at a standard condition of 70 deg. F. and 50 percent relative humidity. Curing of sealants may be accelerated by applying heat, not to exceed 120 deg. F.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Surface Preparation for Sealant

- All Structural damage and any corrosion removal shall be accomplished in accordance with the aircraft technical manual prior to the application of sealant.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Removal of Damaged Seals.

- Cover the bottom of the tank with barrier material or cloths to prevent tank coating from debris, tools and other foreign materials. Using a spatula or scraper, remove defective sealant. Sealant from short pre-packed or injection seals may be removed with a hooked wire and a small cutting tool. The entire seal shall be clean to permit complete filling with new sealant. Sealant from faying surfaces and some pre-packed surfaces or long injection seals cannot be removed without structural disassembly. Defective fillet seals shall be removed and have the ends cut or tapered to approximately a 45 degree angle. Abraded at least one-half inch on each end or the fillet to prepare the surface for a new fillet seal. Place the remove sealant in a bag or container. For an injection seal, clear the entire channel or groove of old sealant to prevent trapped air from creating a new leak path.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Cleaning of Surface to be Sealed

- Remove all debris and foreign materials from the tank. Starting from the top, clean all surfaces with four-part cleaner or MEK and cheesecloth or gauze pads. The solvent will cause oil, grease, fuel dirt, etc., to float to the surface and make it easy to remove by wiping. Do not allow the solvent to dry. A stiff bristle brush may be used to clean heavy deposits, fasteners, bolts, etc. To avoid contaminating the solvent, always pour the solvent on the cloth. Change cheesecloth as often as necessary. Wipe area dry with cheese cloth and repeat cleaning process at least one additional time to ensure area is clean. Once the area has been cleaned, do not touch the surface with bare hands, as oil or dirt will contaminate the surface and the sealant will not adhere.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
- Covering Exposed Cadmium Plated Parts.
- All Cadmium plated parts which are to be sealed with curing type sealants should be isolated and covered with EC1945. This topcoat shall be fully dried prior to application of adhesion promoter and sealing material.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
- Application of Adhesion Promoter.
- When applying adhesion promoter, Apply a light coat of adhesion promoter to the surface that require faying surface seals. Fillet seals or prepacked seals. The adhesion promoter may be applied by fine bristle brush or with a cheesecloth. Excess adhesion promoter shall be removed by blotting with the cheesecloth. The promoter shall be allowed to dry for 30 minutes before sealant is applied. If more than 24 hours has elapsed or the surface has become contaminated since the application of the adhesion promoter, the surface shall be re-cleaned and new adhesion promoter applied. When applying a pre-coat sealant followed by a fillet seal the adhesion promoter can be applied to the tack-free surface of the pre-coat sealant. Adhesion promoter should be discarded when it becomes cloudy.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Sealant Selection.

- Select the proper sealant in accordance with the aircraft technical manual. Multiple part curing type sealants shall be mixed in accordance with the manufacturer procedures and the application time. Sealant shall not be used regardless of time, when it will not longer readily wets the surface to which it is being applied or is beyond it's established application life

- Sealant Application

- Do not apply sealant to a surface if the temperature is less than 60 degree F. A bimetallic thermometer should be used to check the surface of the temperature. A combination of seals may be required at a single leak location.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Application of Brush coat Seal

- The brush coat may be used for fillets and is applied 0.10 inch wider than the fillet on either side of the seam. Using a brush, apply a seal of brushable curing type sealant on top of the adhesion promoter. The brush coat seal is worked into and around crevices, holes, seams, fasteners, and on the surface to be sealed. Allow the surface to become tack-free before application of final seal. Brush coats shall not be used over any primary seal.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Application of Fillet Seal or Isolation Seal
- Apply adhesion promoter if required.
- Insert mixed fillet type sealant into filleting gun.
- Select a nozzle for size of fillet to be applied. Small fillet require a nozzle with a small orifice, likewise large fillets require a nozzle with a large orifice. If necessary set up a locally fabricated device, to simulate the component to be filleted, to help determine orifice size.
- Apply a bead of sealant, for large repairs apply the sealant in approximately three foot lengths.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Work the bead of sealant with a spatula, to full all voids in the seam and to remove all trapped air. Removing all trapped air is extremely important to obtaining a leak free service life of the repair.
- For small fillets, a single bead is all that is required. Shape the fillet to conform to the dimensions in accordance with the aircraft maintenance manual. After the sealant is tack-free, examine the fillet for air bubbles. Repeat the repair for any air pockets found.
- For large fillets, a double bead should be applied. Apply a small bead and work into all voids to remove all trapped air. Allow to cure to a tack-free and examine for air bubbles. Bubble cavities shall be enlarged to permit easy filling during application of final full-bodied fillet.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
 - Apply final full bodied fillet and shape to conform to the dimensions as required in the aircraft maintenance manual. After sealant is tack-free, examine for air bubbles. Repeat repair for any air pockets found.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:
 - Application of Flaying Surface Seal.
 - Insert mixed filleting type curing sealant in filleting gun.
 - Apply sealant to flaying surface. Filleting tip should be large enough to apply a bead of sealant that can be spread over the whole surface and allow some sealant to be squeezed out when the parts are assembled.
 - Spread sealant evenly over the entire surface.
 - Assemble the part and clamp with setup bolts, wing type Cleco fasteners, or other temporary fasteners.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Install permanent fasteners, retighten fasteners twice within 30 minutes or before the sealant reaches the end of its application time.
- Remove excess extruded sealant.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Repair of Calking Sealant.
- As sealant ages, it may develop areas of calking. These will appear as light colored powdery areas on the sealant.
- Materials and Equipment required to repair calking sealant. Four-part cleaner, MEK, lint free cheesecloth, stiff bristle brush, safety container, chemical resistant gloves, or operated vacuum cleaner, materials and equipment to apply top-coat, equipment to defuel, drain, and purge aircraft.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Procedures:

- Scrub chalky area vigorously with a dry stiff bristle brush. Hold the vacuum cleaner hose near the work to pick up chalk dust.
- Clean the affected area with solvent and cheesecloth. Dry with clean cheesecloth
- Apply Sealant top coat.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Sealing Fasteners

- Fasteners used in integral tanks are sealed in a variety of ways. A combination of sealing methods may be used on any single or group of fasteners. Always ensure fasteners are torqued to the proper value before applying sealant. Maintenance activities should consult the aircraft documents and remove all temporary repairs and seal the aircraft in accordance with the aircraft maintenance manual.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Self Sealing Fasteners - Repair By Brush Coat or replace fastener.
- Fasteners with sealing washers or O-rings – Torque fastener to specifications. If this does not stop the leak, remove the fastener and inspect the o-ring for nicks, cuts, abrasions, deterioration, or deformation. If any of these conditions are found, replace the o-ring and reinstall the fastener. If the O-ring is not damaged or if replacing the o-ring does not stop the leak, replace the fastener or apply a click patch.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Fasteners Located in Sealed grooves – Repair by injection of non-curing sealant or apply click patch.
- Fasteners sealed by brush-Coat and Fillet. Repair using the procedures as outlined in the aircraft maintenance manual.
- Fasteners Sealed with Dome Nuts – Repair by brush coat or replace dome nut.
- Wet Installed Fasteners – Repair by using the following procedures. The aircraft may not need to be defueled for this procedure.
- Material and equipment required. Scraper, Solvent, Lint-Free cheese cloth, acid brush, adhesion promoter, sealant, filleting gun, and spatula.

Integral Fuel Tank Maintenance

- Lesson 1. Sealants:

- Procedure
- Clean the hole and surrounding area with solvent and cheese cloth. A non-tipping swab may be used for small holes.
- Clean the Fastener
- Apply adhesion promoter to the fastener and the walls of the hole.
- Apply a small bead of curing type filleting sealant around the shoulder of the fastener.
- Install the fastener and tighten to the proper torque. Final torque shall be applied before sealant reaches the end of its application life.

Integral Fuel Tank Maintenance

- Lesson 2. Access Panel Maintenance

- IMPORTANT: THE FOLLOWING INFORMATION AND OR PROCEDURES ARE FOR TRAINING PURPOSES ONLY AND SHOULD AT NO TIME SUPERCEDE OR REPLACE THE AIRCRAFT MANUFACTURES' TECHNICAL DATA. (I.e.: MAINTENANCE MANUALS, STRUCTURAL REPAIR MANUALS, OVERHAUL MANUALS etc.)

Integral Fuel Tank Maintenance

- Lesson 2. Access Panel Maintenance

- Panel removal Tools required
- 3/8 drive impact “Butterfly”
- 3/8 drive APEX tip holder
- Applicable APEX tip
- 3x Rivet gun – sometimes needed
- Screw buster – sometimes needed

Integral Fuel Tank Maintenance

- Lesson 2. Access Panel Maintenance

- General rules for panel installation
- Always inspect panel, panel flange, hardware and general area for any defects and report findings to supervisor on site.

Integral Fuel Tank Maintenance

● Lesson 2. Access Panel Maintenance

- Panel Installation
- Always refer to paperwork related to the removal of panel to insure all appropriate tasks associated to the area have been accomplished and inspected and also any OK's to close have been performed and documented. Check all dome nuts and nut plates for security.
- Check length of panel hardware to insure proper length prior to installation.
- Do not install access panels with air tool unless a preset torque feature is available on screw gun. Set torque value of fasteners.
- Install panel using the above general rules and I.A.W. manufacturers maintenance manual or structural repair manual.

Integral Fuel Tank Maintenance

● Lesson 2. Access Panel Maintenance

- Access Panel Cleaning – Prepping (General)
- After removal of panel wipe panel off with clean rag and solvent.
- Remove all sealant from panel and panel landing (flange) with plastic or non-metallic scraper.
- Inspect condition of O-ring (seal) for wear.
- If panel has removable O-ring, remove worn out O-ring.
- Clean O-ring channel (groove) with wire brush and solvent.
- Inspect panel for any bare aluminum.

Integral Fuel Tank Maintenance

- Lesson 2. Access Panel Maintenance

- Access Panel Cleaning – Prepping (General)
- If bare aluminum spots exist, treat with alodine and rinse with water.
- After treatment with alodine, wipe panel down with clean rag and solvent.
- Then mask off O-ring channel and apply the applicable fuel tank primer to panel.
- Then apply glue for O-ring (ED-776) in O-ring channel.
- Install O-ring into groove making sure to install flat side down.
- Apply approved lubricant on O-ring.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- IMPORTANT: THE FOLLOWING INFORMATION AND OR PROCEDURES ARE FOR TRAINING PURPOSES ONLY AND SHOULD AT NO TIME SUPERCEDE OR REPLACE THE AIRCRAFT MANUFACTURES' TECHNICAL DATA. (I.e.: MAINTENANCE MANUALS, STRUCTURAL REPAIR MANUALS, OVERHAUL MANUALS etc.)

Integral Fuel Tank Maintenance

● Lesson 3. Fastener Removal and Replacement

● General Fastener Information

- The following is a general description of the most common fasteners in aircraft fuel tanks.
- HI-LOCK interference fit fastener with an allen key hex receptacle at the thread end; there are standard diameter, first oversize and second oversize and on occasion third oversize. Head types vary; ie: shear, tension, flush, protruding, large head, medium head and small head. HI-LOCKS are the most commonly used wing fasteners used on larger aircraft.
- NAS bolts – A close tolerance hex head bolt. Most are standard nominal sizes, 3/16, 1/4, 5/16 etc. Diameter is given by part number (1/32"). Length is given in 1/16" by dash number.

Integral Fuel Tank Maintenance

● Lesson 3. Fastener Removal and Replacement

● General Fastener Information

- NAS screws - A close tolerance screw with different sizes and types of tip application; ie: Phillips, standard and Tri-Wing etc. Most are standard nominal sizes, 3/16, 1/4, 5/16 etc. Diameter is given (1/32") by part number such as NAS1104, NAS1105, NAS1106. Length is given in (1/16") by dash number. NAS1105-8
- Rivets – Rivets differ and are identified by, (1) style of head, (2) material (aluminum primarily) and (3) size (diameter and length). Head styles are as follows: round head (protruding, Button Head), flush head (counter sunk head), flat head and universal head. The 2 most common types are the AN 426-6-6 (flush) and the AN 470-5-8 (universal) BA, BB, CE, BACB30BA6-6

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement
- General Fastener Information
- Huck bolts – Fasteners that come in standard nominal sizes, ie: 3/16, 1/4, 5/16 etc. Heads most common are flush and universal type. Huck fasteners are installed by placing a collar on stem at butt side of fastener and swedging that collar with a pneumatic gun.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement
- General Fastener Removal Information
- Important note on fastener removal: When performing fastener maintenance on the ramp without parts support, never drill fasteners out with full knowledge of availability of replacements!
- Be as careful with existing fasteners in the removal process while performing fastener maintenance on the ramp with out parts support.
- Once a fastener has been determined to be leaking, has a sheared head, is common to a particular part needed to be removed or for any other reason must be removed the following information is designed to be a basic guideline.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- General Fastener Removal Information

- Locate the fastener inside the tank by visual means or if applicable by magnet.
- Check for fastener clearance to other fasteners, components and structure for removal and installation.
- Determine the type of fastener to be removed, ie: hi-lock, huck bolt, NAS bolt, rivet etc.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- Hi-lock

- Remove Collar off the end of the hi-lock inside tank
- Drive hi-lock out of the hole from inside tank
- Clean old sealant from around the hole after removing Hi-lock
- Replace with new Hi-lock
- The steps mentioned in 15.8.1 thru 15.8.4 are for hi-locks that are a tight (interference) fit fastener, if hi-lock is loose and in a spinning condition use the following steps: The hole should be stepped up to first over size.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- Hi-lock
- Locate an allen key that fits the end of the hi-lock, place key in the end and hold key while removing nut (collar).
- After nut (collar) is removed, knock fastener completely out.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- When removing huck bolts follow these basic steps.
- CAUTION: huck bolts or other swedged butt type fasteners are a one-time use only fastener. Once removed fastener must be replaced with an equal strength fastener.
- Using the right diameter collar cutter, remove collar and knock fastener down flush with skin or structure.
- If fastener remains in fastener hole, punch it out with the same or one diameter less punch set. CAUTION: Be sure to stay as straight on the fastener as possible to avoid damaging the hole. For reference see fig. 2.8.4

Integral Fuel Tank Maintenance

● Lesson 3. Fastener Removal and Replacement

- When removing NAS bolts or NAS screws follow these basic steps.
- Usually removing bolts or screws is a 2-tech job. First try removing the nut as described in section 2.8.1. If fastener is spinning ask for assistance by having another tech hold the head of the fastener while removing the nut.
- There is no need to back nut off just flush with the end of the fastener if the fastener is spinning.
- If fastener is spinning, remove nut as described in 2.10.1 and push or knock down until fully removed.

Integral Fuel Tank Maintenance

● Lesson 3. Fastener Removal and Replacement

- When removing rivets follow these basic steps.
- When rivets are leaking they can sometimes be repaired by re-bucking them in the standard riveting method.(rivets should be inspected after re-bucking they could crack)
- Standard riveting method as follows: Place rivet gun with appropriate set on head side of rivet, place bucking bar on butt side of rivet and riveter hits head of rivet with a single burst while bucker applies steady and solid pressure with bar against butt side of rivet.
- If the above procedure does not repair leaking condition, rivet must be removed and replaced.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- When removing rivets follow these basic steps.
- To remove rivet, rivet must be drilled out or head removed and punched out.
- Before attempting to punch rivet out, have another tech back up by placing a buckling bar on structure just adjacent to rivet butt and holding bar firmly until rivet is completely removed.

Integral Fuel Tank Maintenance

- Lesson 3. Fastener Removal and Replacement

- General Fastener Installation Information.
- When installing fasteners such as hi-locks, NAS bolts and screws follow these basic steps.
- When installing the same fastener removed, first insure that the fastener is the correct length, diameter and head style before installing.
- After checking fastener, clean fastener with a wire brush and solvent.
- Clean hole, countersink and structure inside tank around hole with a bottlebrush and wire brush with solvent.
- Completely dry area with vacuum or rags.

Integral Fuel Tank Maintenance

● Lesson 3. Fastener Removal and Replacement

- General Fastener Installation Information.
- Apply sealant to fastener; this is called installing a fastener “wet” or “wet installation”
- Insert fastener in hole and drive in completely.
- Remove excess sealant from head of fastener with a rag.
- Install a washer and lock nut and tighten down firmly. NOTE: On washer installation, 2 thick washers is generally the maximum amount allowed, if nut bottoms out on shank with 2 thick washers used, fastener length is too long after nut completely tight there should only be 1 to 3 threads showing above the nut, if more show the nut is most likely bottomed out.

Integral Fuel Tank Maintenance

● Lesson 4. Fuel Tank Entry Tool/Equipment Control

- Management and supervisory personnel at all levels are responsible for maintaining accountability of all tools, shop items and equipment etc. that are carried into or onto an aircraft while it is in work.
- All employees will maintain accountability of tools, shop items and hardware taken inside a fuel tank or cell at all times.
- Prior to entering a tank, the employee will inventory all tools, equipment and shop items required for the task. At the end of each task or job, prior to close up of the fuel tank or cell, each employee will insure that all tools, equipment and shop items used inside the tank are accounted for.

Integral Fuel Tank Maintenance

- Lesson 4. Fuel Tank Entry
Tool/Equipment Control

- Supervisory personnel will insure accountability of all tools and equipment prior to close up of fuel tanks or cells, or at the end of each shift.
- If at any time during the performance of a task, a tool, shop item or other items taken into the tank or cell is discovered missing, quality control will be notified immediately. Activity in the affected area involved must cease and a search initiated for the missing item by all employees involved in the task.

Integral Fuel Tank Maintenance

- Lesson 5. Fuel Leak Evaluation and
Classification

- Fuel leakage from an aircraft fuel tank is divided into four (4) groups. These 4 groups provide a means of evaluating the safety of operation an aircraft with fuel leak presents. Each group is determined by a visual examination of the wetted area around the leak exit point on the affected aircraft. Wetted areas must be wiped clean and dry after each examination for an accurate re-evaluation of the leak. The size pattern of a leak is based on and examination of the area 15 minutes after the leak is first noticed and the area has been wiped clean and dry. The 4 groups of leaks are classified as follows:

Integral Fuel Tank Maintenance

- Lesson 5. Fuel Leak Evaluation and Classification

- Stain – A Stain is a leak where the wetted area is not larger than 1-1/2 inches in diameter after 15 minutes interval has elapsed.
- Seep – A Seep is a leak where the wetted area has not progressed more than 4 inches from the point of exit after the 15 minute interval has elapsed.
- Heavy Seep – A heavy seep is a leak where the wetted area has not progressed more than 6 inches from the point of exit after the 15 minute interval has elapsed.
- Running Leak – A running leak is any leak in excess of a heavy seep. Fuel will reappear immediately after being wiped dry and may run or drip from the surface.

Integral Fuel Tank Maintenance

- Lesson 5. Fuel Leak Evaluation and Classification

- After a leak has been classified, the air carrier Maintenance manual must be consulted for the appropriate corrective action to be taken. Care must be exercised to prevent the fuel from progressing to a critical area of the aircraft, such as where electrical equipment or heat is present or may be present, so there is no possibility of fuel being blown into the fuselage interior during flight.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- IMPORTANT: THE FOLLOWING INFORMATION AND OR PROCEDURES ARE FOR TRAINING PURPOSES ONLY AND SHOULD AT NO TIME SUPERCEDE OR REPLACE THE AIRCRAFT MANUFACTURES' TECHNICAL DATA. (I.e.: MAINTENANCE MANUALS, STRUCTURAL REPAIR MANUALS, OVERHAUL MANUALS etc.)

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Always check magnehelic gauge for calibration and working order before applying pressure or vacuum to the tank. Check plugs in back.
- Always check to make sure a RED STREAMER or REMOVE BEFORE FLIGHT flag is attached to vent plugs or lines being tapped off.
- The gauge monitor MUST never leave the gauge while test is in progress.
- Always disconnect source of pressure or vacuum when test completes or monitor leaves the gauge.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Check with any mechanics in the area that may be performing fuel line or valve maintenance before test begins.
- While performing Negative Test Monitor; must stay ALERT and AWAKE through the entire test.
- While performing Negative Test Monitor; must never let pressure back in tank too quickly.
- Monitor must check on ALL techs' by use of tapping method every 5 minutes during negative.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- ALWAYS remove vent plugs before fueling aircraft or transferring fuel.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Positive Check – Dry Run
- Install vent plugs ensuring a tight fit.
- Install pressure plate.
- Check magnehelic gauge – Install on HIGH position.
- Install magnehelic gauge – Ensure air fitting and coupling engaged properly.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Positive Check – Dry Run
- Close ball valve.
- Connect ½" or ¼" air hose.
- Perform dry run.
- Open valve – Check gauge for movement, if steady movement occurs, close valve, remove air hose, open valve to release air.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Positive Check – Pushing Fuel
- Repeat steps above; do not apply soap to aircraft.
- Ensure proper pressure 2.0 to 2.5 PSI.
- Clean areas with evidence of fuel with solvent.
- Remove sealant from any voids or seams that show evidence of fuel.
- Watch closely for seepage or pushing of fuel and mark applicable areas with polish.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks
- Positive Check – Pushing Fuel
- Mark fasteners with circle around the fastener.
- Mark seams with arrow pointing directly at leak exit point.
- Mark castings with arrow and description of I/B, O/B, casting or bolt ETC.
- Important to mark clearly so any tech can understand any potential problem.

Integral Fuel Tank Maintenance

- Lesson 6. Pressure Testing – Integral Fuel Tanks

- Positive Check – Soap Solution
- Repeat steps in section 5, 5.1 to 5.6
- Ensure proper pressure 2.0 to 2.5 PSI.
- Spray all applicable area with soap solution.
- Mark all leaks with polish as described in section 6, 6.6 to 6.9.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Negative Check
- The most important item to check before performing this procedure is to review the aircraft tech manual. If aircraft has fuel bladder cells, the tank to be checked MUST be isolated from bladders or MAJOR DAMAGE WILL OCCUR. When in doubt contact a manager for tech assistance.
- If the aircraft being worked has any other type of AUX system (fuel) the aircraft tech manual should be reviewed before attempting this procedure.
- After tech manual has been reviewed, install applicable vent plugs or expansion plugs to isolate tank to be tested.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Negative Check
- Set-Up Negative Pressure Plate.
- Before attaching mannehrlic gauge, insure that hose or pipefitting is installed in the LOW position on back or side of gauge.
- Suck on hose or pipe to test gauge before test, needle should rise.
- Perform dry run to insure that isolated tank will test at 1.5 to 2.5 negative pressure.
- Perform Negative Test.
- Remove all plugs after test completed.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Duties of "Tech in The Tank" On Negative Pressure Check.
- Bring the following items in the tank for this test:
- At least one full bottle of soap and water.
- Light source – explosive proof.
- Polish to mark leaks and locations.
- Inspection Mirror.
- Scrapping tools and picks.
- Complete wrench set.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks
- Duties of “Tech in The Tank” On Negative Pressure Check.
- Before test begins position yourself in leak area and apply soap solution.
- Begin test, always look for leaks at beginning of test, some leaks are large enough that they can only be seen under very low pressure.
- At 1.5 to 2.5 negative pressure, most leaks will appear, ALWAYS remove sealant at leak area to determine exact leak point at structure. ie: bat, hi-lock, seam, casting, clip ETC.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks
- Duties of “Tech in The Tank” On Negative Pressure Check.
- Once all leaks are located, mark clearly at leak point and also mark on ribs pointing to leaks that are marked but cannot be readily seen.
- On completion of checking for leaks and marking all areas, knock on skin surface with several quick hard knocks to notify monitor. Your test is complete and you need to exit tank.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks
- Duties of Monitor “On Negative Pressure Check and “Tapping” Method of Communication.
- Always remember SAFETY is the most important duty of the monitor. The safety of the “Man in the Tank” is in your hands.
- When the “Tech in the Tank” gives the OK, place negative plate over access panel area.
- Open valve completely to allow maximum vacuum.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks
- Communication using the “Tap” method
- One tap = .5 PSI
- Two taps = 1.0 PSI
- Three taps = 1.5 PSI
- Four taps = 2.0 PSI
- Five taps = 2.5 PSI
- Six taps = 3.0 PSI

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Checking status and safety of “Tech in the Tank” = “Shave and a Haircut” tap tap tap tap tap Tech should respond with 2 taps to notify his or her status is OK.
- When checking on tech status, if no response is given, quickly check again.
- If there still is no response, stop check immediately by removing vacuum source and relieving pressure at moderate rate.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Once pressure is relieved to a “0” PSI status, remove plate and determine status of tech by voice contact and respond with immediate and appropriate action. If needed send another mechanic or nearest person to get help.
- NEVER leave the tech to get help. Stay at access hole until help arrives.
- On standard negative test monitor should tap at each change of pressure.
- When reaching the desired amount of pressure, crack valve enough to maintain that desired pressure and check on status of tech at least every 5 minutes until given the signal by the tech to end test.

Integral Fuel Tank Maintenance

- Lesson 7. Negative Testing – Integral Fuel Tanks

- Duties of Monitor “On Negative Pressure Check and “Tapping”
- Method of Communication.
- Ending a test must be accomplished by first removing vacuum source and then SLOWLY receiving pressure until it reaches a “0” PSI status.
- Remove test plate and assist tech with tool removal and any other needs.

Integral Fuel Tank Maintenance

- Lesson 8. Cleaning Tanks For Closing

- Important: The following information and or procedures are for training purposes only and should at no time supersede or replace the Aircraft Manufacturers’ technical data. (I.e.: Maintenance Manuals, Structural Repair Manuals, Overhaul Manuals etc.)

Integral Fuel Tank Maintenance

- Lesson 8. Cleaning Tanks For Closing

- Basic Information on Cleaning Tanks
- The cleaning of fuel tanks after maintenance has been completed is one of the most important tasks in the process of any maintenance inside fuel tanks.
- Attention to detail and thoroughness must be adhered to when cleaning fuel tanks for "OK" to close

Integral Fuel Tank Maintenance

- Lesson 8. Cleaning Tanks For Closing

- Steps to Follow in Cleaning For Tank Closure.
- The following will be needed to accomplish this task: vacuum with small end, 2" and 1" brush, possibly an air blower and water.
- Using a brush, start on top surface of structure and brush all debris down to lower surface.
- Vacuum up all debris on lower surface.
- Using a brush, remove debris from spars and ribs by brushing them down knocking all debris to lower surface.
- Vacuum all debris on lower surface.
- Repeat steps 2.2 thru 2.5.

Integral Fuel Tank Maintenance

- Lesson 8. Cleaning Tanks For Closing

- Steps to Follow in Cleaning For Tank Closure.
- Look over area to be closed with a mirror and any area with debris left must be cleaned with water and a brush to insure all debris has been removed.
- After tech performing this task has determined that all debris has been removed, he or she must have area inspected by their immediate supervisor before presenting to customer inspection