

Aircraft refueller rigid tank truck type suitable for underwing pressure and overwing gravity fuelling of aircrafts with kerosin, with a tank capacity of 20.000 l useful plus ullage 4% for expansion according to ADR Code and 400 l for deadstock and a fuelling performance up to 1.100 l/min, including assembly of fuelling equipment cabinet and tank on a suitable truck chassis.

OPERATIONS

- Underwing pressure refuelling
- Overwing gravity refuelling
- Loading of tank
- Self-loading of the tank
- Top loading
- Defuelling
- Draining of tanks.

PERFORMANCE

- Underwing refuelling – 1.000 l/min.
- Overwing refuelling – 400 l/min.
- Defueling – 250 l/min.
- Bottom loading – 1.500 l/min.

NORMATIVE

- JIG 1
- EN 12312-5
- ADR 2017.

TRACTOR CHASSIS

- IVECO TRAKKER AD380T38H 6x4
- Wheelbase: 4500+1380
- Euro 3
- ADR and PTO.

TRACTOR CHASSIS MODIFICATIONS

- Subframe according OEM guidelines.
- Installation of 2 motor stop devices in the pneumatic system.
- Mounting of mudguards including brackets and mudflaps for the rear wheels.
- Adjusting of rear overhang.

CHASSIS MODIFICATIONS AND COMPLETION

- Subframe according RTD guidelines.
- Installation of motor stop devices in the pneumatic system
- Mounting of mudguards including brackets and mudflaps for the rear wheels.

TRUCK TANK

- Rigid tank of 20.000 l gross volume. (excluding deadstock/excluding ullage).
- Total volume of 21.900 l. approx..
- Min. 4% ullage.
- Alluminium XTRAL 728 complying with ADR 2017.
- Biconical shape with elastic connection to the subframe.
- Baffles (4) with DN500 access hole, made of the same aluminium.
- Water sump in the lowest point of the biconical joint.
- Pressure test, 0,4 bar. Working pressure, 0,2 bar.
- Welding procedure acc. EN ISO 15614-2 and licensed welders acc. EN ISO 9606-2.
- Piping made of alluminium alloy – Test 16 bar. All flanged connections.
- Rear stainless steel ladder.
- Aluminium antislip catwalk on top of the tank.
- Aluminium safety foldable handrails.

TRUCK TANK FITTINGS

- 1 Nos. of DN500 manhole made of aluminium with vent valve and internal safety flame trap, inspection port (Ø10") and dipstick hole acc. to ADR, API RP1004 and EN 13314 and 13317. Brand ET.
- Tanks contents gauge DN150 calibrated at 1.000 l. Brand Bayham
- Calibrated aluminium dipstick.
- 1 circular to avoid strength concentration inspection opening at the front end, Consisting of a flange with blind flange TW 3.
- 1 pneumatic overfill sensor. Niehuser N17.
- 1 pneumatically operated bottom valve 3" with both in parallel ball valve 2" and Camlock 2" for drainage plus ball valve 1", type APOLLO, a hose and a 1" Camlock coupling for sample is installed at the lowest point of the water sump, to drain it completely.
- 1 vent valves 2", with flame arrester. VSB50 ET.
- 1 coaming valve 3". 6510 ET.
- 1 pressure balance bottom valve 4" for bottom loading. PBV 100 115 90 S HAAR.
- 1 pneumatic foot valve 4" for dispensing. PBV 100 115 90 U HAAR.

BOTTOM LOADING

Consisting of (for both truck and trailer tanks):

- 1 automatic high-level shut-off valve, floater controlled, pneumatically acting (closing). On made Niehuaser model N17.
- 1 bottom loading valve 4" (balanced pressure), pneumatically operated, valve seat inside the tank Alfons Haar PBV 100 115 90 S.
- 1 bottom loading manifold 4", made of aluminium, connected to the bottom loading valve, one flanged connection at left hand side of the refueller, equipped with:
- 1 aircraft coupling 2 ½", ground type, brand Manntek ISO45, with dust cap.
- Only in the truck, 1 selective coupling 2 ½" with dust cap. Brand Manntek. This coupling can be modify to 3 or 4".

FLUSHING/TESTING DEVICE

Consisting of:

- 1 ball valve 3", acting as throttle valve to simulate aircraft's counter pressure.
- 1 quick-disconnect dry break connection, make "minimes", to connect the test or master gauge.
- 1 test gauge, glycerine-filled, easy connectable via flexible hose and "minimes"-type quick disconnect coupling to the above test connection.
- 1 tank isolating valve 4", pneumatically operated, manually operated emergency opening in case of pneumatic failure, valve seat inside the tank Alfons Haar PBV 100/100 FL90°.

FUELING EQUIPMENT CABINET

Mounted on the truck chassis directly behind driver's cabin, for housing of the complete fuelling equipment, bottom and front side panelled. Framework made of welded box type steel profiles, panelling made of metal sheets; all steel parts sand-blasted and coated, clefts between profiles and panels tightened with constant elastical plastic. Easy detachable roof made of aluminium on top of the cabinet. Lateral flaps of aluminium on both sides of the cabinet to be opened upwards under gas tension.

PUMP ASSEMBLY

Comprising:

- 1 self-priming vane pump, with mechanical shaft sealing and overstream valve, especially suited for aviation fuel.
 - o Alfons Haar FPOG 80-900, up to 1.200 l/min. Hydraulically driven.
- 1 pump suction line 4" / 3" dia. , made of aluminium, mounted between tank isolating valve and pump suction stub including elastical socket.
- 1 pump suction strainer DN 100 type PF 100/1ES for high solids.
- 1 outside suction connection including ball valve 3" with stainless steel ball and 1 aircraft coupling 2 1/2", ground type, brand Manntechnik model Aviation, with dust cap.
- 1 pump pressure line 3" / 4" dia. mounted between pump pressure stub and fueling system.

FILTER/WATER SEPARATOR

- 1 ut. filter / water separator made in stainless steel casing and hinged cover, front loader type, fully equipped with water sump and all necessary fittings to connect the following additional:

brand:	FAUDI
model:	FW10-H-T 3/842
with coalescer:	MIL.1-559/5
flow rate:	up to 1222 l/min
working pressure:	10 bar
test pressure:	14.3 bar
specification:	API 1581 5 th edition, Category C, Type S for Jet A1, JP 1, JP 4. JP 8, kerosene.
	<input type="checkbox"/> max. 15 ppm free water in the outlet stream.
	<input type="checkbox"/> max. 0,26 mg/l (average) particles in the outlet stream.

Equipped with:

- 1 piston type differential pressure gauge with double scale (bar and psi), with built-in spring return test valve to check free move of piston, brand Gammon model GTP-534-PB-30.
- 1 automatic water detector, pneumatically operated, brand Caldal-15, installed in the water sump, with flip flop indicator red / green located in the panel at the operations side, indicating free water in the water sump (red signal) and influencing the fuelling operation (shut down of fuelling operation in case of free water).
- 1 water drain pipe with two ball valves 1" with stainless steel ball and quick disconnect coupling / cap make Kamlok, leading to the maintenance side.
- 1 automatic air / gas eliminator on top of filter vessel.
- 1 gas return line with sight glass, leading from air / gas eliminator back to the tank, including necessary flexible hoses between filter and tank, pipe inside the tank leading to tank bottom to prevent free-fall of fuel, sight glass with flow indicator.

METER

- 1 ut. bulkmeter 3" (mechanical fuel meter), with counter head, roller type with resettable large number counters (five digits) and non-resettable totalizer (eight digits) and rate-of-flow indicator, counter head and rate-of-flow-indicator directly mounted and mechanically driven:

Brand:	Satam
model:	ZC 17 80/80.
counter head:	Veeder root R/VR7887
min. flow rate:	130 l/min
max. flow rate:	1300 l/min
calibration:	decaliter
flange:	DN 65

INLINE PRESSURE AND DEADMAN CONTROL

Inline mounted fuelling pressure control system, in addition to the coupler mounted hose-end pressure controller, acting as secondary pressure control as well as deadman control, consisting of:

- 1 inline pressure control valve 3", make Alfons Haar, model AOA80 AV, fitted upstream from the filter / water separator, acting as pressure control- and deadman shut-off valve, fuel- / air operated, pressure balanced and held open by a regulated supply of air at the required pressure (reference pressure), deadman control is achieved by exhausting the air set reference pressure causing the control valve to close.
- 1 air pressure regulator / control valve, adjustable, acting on the inline valve pressure regulator block Alfons Haar STV 17A + deadman block Alfons Haar STT11AV.
- 1 continuous adjustable venturi pipes 3", brand Haar model VEN 80/DR, acting on the inline pressure control valve.

UNDERWING REEL HOSE SYSTEM

- 1 ball shut-off valve 3" with stainless steel ball, fitted to the underwing reel hose line.
- 1 spoked wheel hose reel 2", hub and elbow of aluminium, for single-lay helical winding.
- 1 reel hose 2", 25 m length, brand Conti / Elaflex, type PH-50F.
- 1 pressure fuelling nozzle 2 ½", brand Carter, type 64200 CDEF4 6K, including dust cap, 100 mesh strainer, grounding cable, vacuum breaker, HEPC with 45 psi spring, UK-style-handle, swivel quick disconnect, unisex non-valved coupling, dust cap

OVERWING REEL HOSE SYSTEM

- 1 ball shut-off valve 2" with stainless steel ball, fitted to the overwing reel hose line.
- 1 spoked wheel hose reel 2" , hub and elbow of aluminium, for single-lay helical winding.

- 1 reel hose 1 ½", 25 m length, brand Conti / Elaflex, type VHD-C.
- 1 gravity fuelling nozzle 1 ½", brand Elaflex model ZVF 50.1, complete with strainer, dust cap, bonding cable.

DEPRESSURISATION SYSTEM / PRESSURE RELIEF

This system avoids a system pressure higher than appr. 1 bar in case of thermal expansion of fuel when the refueller is in stand-by position.

- 1 pneumatically operated pressure relief valve, automatically controlled by the interlock system (valve opened under driving conditions, valve closed under fueling conditions).
- 1 emergency shut-off valve for the above relief valve.
- 1 spring loaded, manually operated ball shut-off valve for manual pressure relief.
- 1 spring loaded non-return valve, fitted in the depressurisation line to the tank, saving a counter pressure up to approx. 1 bar.
- 1 depressurisation line connected to the degassing line of the filter.
- Sufficient by-pass lines to the fueling valves incl. the necessary shut-off and non-return valves.

OPEN SAMPLING

- 1 Millipore sampling connection, brand Gammon model GTP 235, fitted to filter's outlet.
- 1 sampling / drain connection at filter / water separator sump (refer to FILTER / WATER SEPARATOR).
- 1 sampling / drain connection at tank's water sump (refer to TANK FITTINGS).

VISUAL CHECK FUEL SAMPLING

Visual Close Check Sampling 4 l. with a Jar inlet from upstream and downstream filter and return to the tanker through a pneumatic pump and slope tank 40 l, controlled mechanically using deadman valves Apollo type.

Slope tank can return the sampled fuel to the circuit on explicit demand (to be quoted additionally).

DRIVING SYSTEMS

- 1 hydraulic drive for fuelling pump, driven from engine's PTO, consisting of:
 - o 1 hydraulic drive system of fuelling pump using hydraulic motor Parker
 - o 1 pump speed indicator, mechanically driven via fully closed gear box and flexible shaft.
 - o 1 electrically operated pump speed control with reset to idle speed in case of

deadman release.

- 1 hydraulic drive for hose reels, connected to refuelling pump's drive, consisting of:
 - o 1 hydraulic tank 75 l, with dipstick and strainer (volume required to avoid overheating and lamination of hydraulic oil during operation in extreme conditions)
 - o 1 hydraulic pump.
 - o 2 hydraulic motors, brand Parker, with roller chain drive (can be re-tightened) for hose reel drive.
 - o 2 hose reel controls, lever type, positions "OUT", "STOP", "IN", including adjustable speed control; hose reel control apparently placed to the reels at operating stand for easy one man operation.
- And all necessary control valves, high-pressure hoses, tubes and fittings

PNEUMATIC SYSTEM

The standard chassis air system is supplemented with:

- 1 pressure protection valve which ensures that priority air supply is always available for vehicle's brake system.
- 1 auxiliary air reservoir with drain valve.
- 1 micronic filter / dryer and lubricator.

And the following equipment is connected to this:

- 1 pneumatic control system for defuelling operation (refer to PRE-CHOICE VALVE ARRANGEMENT and DEFUELLING SYSTEM).
- 2 pneumatically operated hose reel blocking devices, automatically controlled by the interlock system (refer to DRIVE-AWAY INTERLOCK).
- 1 pneumatic / electric system for deadman operation (refer to DEADMAN REMOTE CONTROL).
- 1 pneumatic / electric system for interlock operation (refer to DRIVE-AWAY INTERLOCK).
- 2 emergency engine stop devices, placed at operation and maintenance side (refer to CHASSIS MODIFICATIONS)

DEADMAN REMOTE CONTROL

Acting on the inline pressure control valve and the truck's / tractor's engine to idle speed, electrically-pneumatically operated (pneumatic pressure loss stops fuelling operation), including:

- 1 electrically / pneumatically operated deadman control system, brand Fluid Transfer model deadman timer system including handswitch, spiral cable appr. 14 m length, lamp and solenoid valve, solenoid valve fitted into pneumatic supply line of the deadman shut-off valve.
- 1 override valve, manually operable, locked in "DEADMAN ACTUATED"-position.
- 1 aluminium storage box for spiral cable and handswitch.

DRIVE - AWAY INTERLOCK

This system avoids the parking brake being released unless

- PTO is engaged.
- reel hose nozzles are correctly stowed
- lateral flaps of fuelling equipment cabinet are fully closed
- bottom loading is disconnected

- outside suction connection is disconnected
- collapsible handrailing

An override switch is installed inside driver's cabin, easily accessible in control panel, additional to a RED warning light, showing that interlock is overridden. When any interlock is activated an amber light in the dashboard of the cabin is ON.

The interlock system controls additionally the tank isolating- / foot valve, the hose reel blockings (if fitted) as well as the complete pneumatic control system (vehicle in driving position - no air pressure in auxiliary systems, vehicle in fuelling position - interlock activated and auxiliary systems operable).

GAUGES

Following parameters are indicated in bar and psi by glycerine damped gauges, grouped together in a panel, each gauge labeled in English language

- pump vacuum
- pump pressure
- venturi pressure underwing reel hose
- hydraulic pressure
- pressure control system air reference pressure

All gauges, excluding hydraulic gauge, are equipped with test connections, male part with dust-cap, quick-disconnect type, brand Walther or Gammon, 6 mm diameter and isolating valves enabling the check with an external master gauge.

OPERATING STATION

All indicators, controls and operation handles etc. are conveniently grouped and easily reachable to an illuminated operating station inside the pump cabinet at operation side, for easy one man operation, clearly labelled with bolted plastic plates. An additional flow diagram is fitted for sufficient information. Labelling is executed in English language.

ADDITIONAL EQUIPMENT INSIDE CONTROL CABINET

- brackets / stowings for reel hose nozzle and overwing fuelling device guiding rollers for proper hose operation.
- all swivels and reel hubs without oil plugs / lubricating nipples (non-lubricating type).
- metal plate (aluminium) with flow diagram in English/Arabic language and JET A-1, flammable and no smoking logo.

GROUNDING / BONDING EQUIPMENT

- 2 cable reel, spring rewind, with 30 m grounding / bonding cable (steel, PVC coated) and brass crocodile clip.
- 1 earthing / grounding strip, fitted to truck's chassis frame.
- Earthing / grounding clamps at tank water sump, bottom loading connections and drain-sample point of filter / water separator.

EXTINGUISHERS

- 2 fire extinguishers, 9 kg each, dry-powder (A,B,C) on both side of the chassis.
- 1 fire extinguisher, 2 kg, ABC (inside driver's cabin).

OPERATION MANUAL / SPARE PARTS

Two sets will be supplied incl. operating and maintenance instructions, diagrams and drawings, spare parts catalogue and sub-suppliers literature in English language.

Spare parts will be available for a minimum period of ten years after delivery of the vehicle.

TESTS

- Pressure test of tank (0,4 bar).
- Pressure test of complete system (13 bar).
- Working pressure system (10 bar).
- Functional test of all components and systems.
- Performance test at work's test stand.
- Weight card for each axle.

CERTIFICATES

- Tank's pressure test certificate.
- Piping system's pressure test certificate.

PAINTING

Painting of the complete fuelling superstructure, in one single colour. Epoxy primer and final PU topcoat.

PRODUCTION

It will be executed under the established quality control system ISO 9001.