

Painting/Lettering/Markings

- Upper 2/3 of cargo tank a heat reflective color 178.337-1(d)
- Licensee/Ultimate Consumer Name (2" – each Side and Rear) 9.211
- Nature of Contents (2" – each Side & each End) – See PHMSA Interpretation 06-0235 172.328(b)(1)
- QT or NQT (2" near nameplate) 172.328(c)(1)(2)
- Emergency Shutoff (3/4" letters) 172.328(d)
- 1075 Placard diamond on point (Each Side and each end of the unit) 172.504(a)
- Placard must be readily visible 172.516(a)
- Placard maintained in Good Condition 172.516(c)(6)
- Test Marking 180.415(b)
 - P = pressure test (hydrostatic test) – 5yrs
 - I = internal visual test 5 yrs for tanks w/ manholes
 - V = external visual inspection – 1 yr
 - K = leakage test – 1 yr (In English w/ Mo and Yr the test was performed in 1¼-inch in height, near the nameplate or forward head)
- Do not fill container if out-of-test/inspection date. Expired test or inspection dates. 180.407(a)(1)
- Inlets & outlets marked "liquid" or "vapor" except for gauging devices, thermometer wells, pressure relief valves/valves/fill line communicating w/ vapor space may be marked "spray fill" 178.337-9(c)
- Markings required by 49 CFR are not Legible 180.407(d)(2)(vi)
- LPG Form 4 decal properly affixed 9.202(c)(1)
- Unit properly registered. No Form 4 9.202(a)
- Non-Odorized (2" – each Side by Propane label) 172.328(e)

Manifest & Discharge Control Documentation

- Amt & type odorant/vapor press. @ 100°F Net gals/load temp/specific gravity @ 60°F/Type product/UN# (Not Req'd to loads cov'd by permanent shipping papers per DOT) 9.212(a)-(c)
- Odorization-ethyl or amyl mercaptan, thiophane 173.315(b)(1)
- Description must be in English 172.201(a)(2)
- Emergency response number required 172.201(d)
- Hazard class or division 172.202(a)
- Material identification number 172.202(a)(3)
- Total quantity 172.202(a)(5)
- LPG identified as NONCORROSIVE OR CORROSIVE on shipping papers 172.203(h)(2)
- Discharge control documentation on unit or in cab 177.840(1)

Container and mounting

- ASME (Non-Spec) and/or DOT MC 330 or 331 9.4.2.1
- Turnbuckles, tie-down bolts, including stops, anchors or other means to prevent container motion 178.337-13(a)
- Transporting mounting (120° arc) 178.337-13(b)
- Supports & bumpers to be attached to a pad welded to container. No welding directly to the tank 178.337-13(c)
- Remount requiring modification must have approval of Design Certifying Engineer 180.413(d)(1)

Maintenance

- Corrosion, dents, defects in weld or any condition, which might render cargo tank unsafe 180.407(d)(2)(i)
 - Damaged or leaking piping, valves or gaskets 180.407(d)(2)(ii)
 - Missing or loose bolts on manhole covers or leakage around manhole covers 180.407(d)(2)(iii)
 - Inoperative or damaged emergency devices and valves, including, self-closing stop valves, excess flow valves and remote closure devices 180.407(d)(2)(iv)
 - Missing or loose bolts, nuts or fusible links 180.407(d)(2)(iv)
 - Damage or corrosion to all major appurtenances on cargo tank such as suspension system (Spring hangers) and those elements of the upper 5th wheel assembly 180.4079(d)(2)(viii) 396.3(a)(1)
 - Maintenance and mounting of lower half of 5th wheel (fish plate) loose or missing bolts, cracks or other defects 393.70(b)(1)(i)
 - Maintenance of vehicles 9.204/396.3(a)
 - Mounting & maintenance upper 5th wheel (rub plate assembly & king pin) loose, missing bolts, cracks or other defects 393.70(b)(1)(ii)
 - Fifth wheel assembly, locking mechanism, excessive play between fishplate & rub plate 393.70(b)(2)
 - Spring hangers & suspension 396.3(a)(1)
- ## Piping, Fittings, and Valves
- Threaded pipe and fittings must be Sch. 80 or better 178.337-9(b)(2) 9.4.3.2(5)
 - Welded or brazed pipe & fittings must be Sch. 40 or better 9.4.3.2(7)
 - Piping supported/secured against damage from expansion, vibration 178.337-9(b)(4)
 - Hydrostatic relief for closed sections of liquid piping hose 173.315(i)(11)
 - Vapor & liquid discharge outlets less than 1¼" may be equipped w/ excess flow valve manual shutoff valve 178.337-8(a)(5)(i)
 - Piping, valves, hoses, fittings must have burst pressure of 4 times container W.P. 178.337-9(b)(1)
 - Primary valves & fittings shall be steel, malleable, or ductile iron construction 9.4.3.8
 - Pipe, tubing, fittings, flex connectors min. equipment design pressure 9.4.3.3
 - Minimum design pressure & approved materials for valves: shutoff, excess flow, back check and remotely controlled 9.4.3.4
 - Liquid discharge valves, except for engine fuel, must be closed while unit is in transit 177.840(g)
 - Unused inlet & discharge opening must be closed with a cap, plug or flange 178.337-8(a)(2)

- Inlet openings must be fitted with an internal valve or back-check valve 178.337-8(a)(3)

Valve & Tank Guards

- Metal protective guard min. 3/16th – thick 178.337-10(b)
- Rear bumper to protect tank and piping 178.337-10(c)(1)
- Pumps protected against breakage by collision, kept in good condition, equipped w/ bypass 178.337-15(a)
- Valves in tank openings for pump by-pass 9.4.3.5

Hose Specs/Flex Connectors

- Each delivery hose assembly permanently marked w/ ID number and Max W.P. – See PHMSA Interpretation 01-0285 180.416(b)
- Hose assembler must mark hose assembly w/ month & year of original pressure test 178.337-9(b)(7)(iii)
- Operator must assure new or repaired delivery hose assembly is pressure tested & permanently marked w/ month & year of test – See PHMSA Interpretation 01-0154 180.416(f)(2)
- Hose marked with mfg. Name or trademark, 350 WP, LP-Gas, propane, continuously marked 9.4.3.5
- Manual stop valve required between internal valve & hose connection 178.337-8(a)(6)
- Flex connectors limited to 3 ft 9.4.3.6
- Rubber flex connections marked as to date of orig. installation/replaced after ten years, cargo tank is remounted or unit is repiped 9.4.3.7

Hose Rejection Criteria

- Damage to hose cover exposing reinforcement 180.416(g)(i)
- Wire braid reinforcement kinked or flattened 180.416(g)(ii)
- Soft spots when not under pressure, bulging under pressure, loose outer covering 180.416(g)(iii)
- Damaged, slipping or excessively worn hose coupling 180.416(g)(iv)
- Loose or missing bolts or fasteners on hose coupling 180.416(g)(v)

Cargo Tank to be Removed From Service if Piping System has any of the Following

- Any external leak identifiable w/o instruments 108.416(g)(2)(i)
- Bolts missing, loose, severely corroded 180.416(g)(2)(ii)
- Manual stop valves will not actuate 180.416(g)(2)(iii)
- Rubber hose flex connectors damaged 180.416(g)(2)(iv)
- Stainless steel connectors with damaged braid 180.416(g)(2)(v)
- Internal self-closing stop valves that fail to close or permits leakage detectable w/o instruments 108.416(g)(2)(vi)
- Pipes or joints severely corroded 180.416(g)(2)(vii)
- Unsafe operations forbidden 396.7(a)(b)
- Valves in liquid discharge system must be closed system free of leaks or the unit must not be driven 177.834(j)(2)

Equipment

- Pumps, compressors, meters, dispensers, regulators, strainers comply w/ 6.17.4 NFPA 58 9.4.4.1
- Installation of liquid meters/protected 6.17.5

against excessive strain/flex connectors permitted.

- Differential regulator required between pump discharge & hose connection where wet hose is connected during transit 9.4.4.5

Miscellaneous

- Fire Extinguisher – 18# with B:C rating readily accessible & mounted on power unit 9.4.7
- Visual determination of charged extinguisher 393.95(a)(3)
- Chock Blocks to be used when parked or loading and unloading 9.4.8
- No smoking on or within 25' of vehicle, points of liquid transfer, delivering or connecting to containers 9.4.10/397.13
- Parking – not on street w/ exceptions, not in congested areas, 50' from building used for assembly, institutional or multiple residential occupancy 9.7.2/397.7
- Electrical wiring in a workmanlike manner 393.28
- Exhaust system – leaking, not secured 393.83
- Tires damaged, flat, bald 393.75
- LP-Gas motor fuel system must comply with Chapter 11, NFPA 58 393.69

Emergency Control Equipment

- Each vapor & liquid discharge outlet 1 ¼" & > internal valve with manual & thermal remote closure – See PHMSA Interpretation 99-0248 178.337-8(a)(4)
- More than 3,500 WC diagonally opposite – manual & thermal remote shutoff at ends of tank 178.337-8(a)(4)(i)
- Less than 3,500 WC thermal closure @ internal valve – on-truck mechanical remote closure tank end furthest from transfer connection 178.337-8(a)(4)(ii)
- Non-metered – passive shut down – stop flow w/o human intervention – 20 seconds – if hose separation – See PHMSA Interpretation 06-0172 173.315(n)(2)
- Metered delivery – 3,500 WC or less, off-truck remote to 150' & close internal valve & stop all motive & aux power – liquid only 173.315(n)(3)
- Compliance dates: Passive shut-down on non-metered. Off-truck remote on metered delivery 3,500 WC or less by first pressure test after July 1, 2001 – MC 330, 331, & Non-Spec – all by July 1, 2006 173.315(n)(5)
- Metered delivery – More than 3,500 WC passive shut-down and for obstructed views either off-truck remote or query system 173.315(n)(2)(3)(4)
- Compliance date: metered delivery, more than 3,500 WC – by July 1, 2003 173.315(n)(5)
- Fusible element 250°F or less 178.337-8(a)(4)
- Fusible element for each internal valve 173.315(p)

Pressure Relief Valves (PRV)/Liquid & Pressure Gauges/Thermometer Wells

- PRV start-to-discharge, design, 173.315(i)(3) & constructed and marked for rated 178.337-9(a)(3) pressure not less than tank WP
- PRV protected so as to open 178.337-10(a) unrestricted in an overturn on hard surface
- One or more spring-loaded relief valves 173.315(i) required
- PRV requirements: markings, rain caps, 173.315(i)(1) communicate w/ vapor space, etc.
- Approved liquid level gauges: rotary tube, 173.315(h) adjustable slip tube, fixed length tube
- Dip tube gauging device intake orifice no 173.315(h)(3) larger than .060" diameter
- Pressure gauge opening restricted to .060" 173.315(h)(4) diameter
- Thermometer well/ thermometer required if 173.315(e) using adjustable liquid level gauge
- One of more fixed liquid level gauge 178.338(a) required
- Pressure & Temperature gauges required 9.4.2.2 tanks over 4,000 gallons [Ref. 5.7.4.4]

Daily/Monthly/Yearly Inspections & Record Keeping

- Pre-transfer safety check of discharge 177.840(m) system
- Monthly inspection or testing record 180.416(d)(5) keeping by operator for: delivery hose assembly, piping system, emergency discharge system, internal valves, etc.
- Annual unattached delivery hose assembly 180.416(e) test
- Record documenting test and inspection of 108.416(f)(3) new or repaired delivery hose
- Owner's record retention: MDR, Mfg 180.417(a)(1) Certificate, other certification including emergency discharge control systems for the life of ownership + 1 year
- User's record retention for use in excess of 180.417(a)(2) 30 days: MDR, Mfg, Certificate, other certification including emergency discharge control system for entire time used + 1 year
- Test or inspection reporting must be in 180.417(b)(2) English, must contain information required in 180.417(b)(1) must be retained until next test or inspection of same type is completed

Cryogenics Units

- One of more fixed liquid level gauge 178.338-14(a)(1) required
- Pressure gauge required 178.338-14(b)