

INVITATION TO COMMENT ON THE DRAFT PHILIPPINE NATIONAL STANDARD FOR STORING AND HANDLING OF E-GASOLINE IN RETAIL OUTLETS (DPNS/DOE FS 6:2010)

Notice is hereby given to all parties to comment on the draft PNS for Storing and Handling of E-gasoline in Retail Outlets (DPNS/DOE FS 6:2010).

All comments and suggestions must be received on or before June 8, 2010. Any proposed change to the draft must be supported with technical explanation/justification and e-mailed to rcpascual@doe.gov.ph.

Gentlemen:

The implementation of Republic Act 8479 otherwise known as the Downstream Oil Industry Deregulation Act of 1998 encouraged the entry of the new players into the downstream oil business, attracting both the established oil companies as well as new non-traditional ventures. Further, Republic Act 9637 otherwise known as the Philippine Biofuels Act of 2006 requires the mandatory use of biofuels to reduce the country's dependence on fuel importations, improve air quality and improve the economic conditions in the countryside.

It is for these reasons, particularly to expand the safe storage, handling and retailing of biofuels-blended petroleum, that the Technical Committee on Petroleum Products and Facilities (TCPPF) chaired by Department of Energy-Oil Industry Management Bureau (DOE-OIMB) initiated the development of technical standards applicable to the downstream oil industry. The TCPPF is composed of representatives from DTI-BPS, DOST-MIRDC, DILG-BFP, DOLE-OHSC, Safety Organization of the Philippines (SOPI), Philippines Institute of the Philippines (PIP) and Independent Philippine Petroleum Companies Association (IPPCAA). A Technical Working Group (TWG) designated for the purpose by the TCPPF and composed of DTI-BPS, DOST-MIRDC, DILG-BFP, DOLE-BWC, DOLE-OSHC, EMB-DENR, SOPI, DOE-EUMB, representatives from oil industry together with bio-ethanol manufacturers conducted the detailed deliberation to draft a technical standard designated as DPNS/DOE FS 6::2010, Philippine National Standards for Storing and Handling of E-gasoline in Retail Outlets.

This standard comprises major topics on E-gasoline characteristics, underground storage tank designs, piping systems and materials as well as code of practice which is intended for the information and guidance of parties interested in operating a petroleum product retail outlet. Aside from the technical contributions made by the TWG members using their own company internal guidelines on station conversion and preparation for E10 use, the following were considered in drafting this standard:

1. Ethanol Blended Unleaded Petrol (E10) Storage Tank Conversion, Facilities Maintenance Instruction No. 6/2006, Corporate Services and Infrastructure

Group, National Operations Division, Technical and Facilities Services
Branch, Canberra, Australia

2. Fuel Ethanol Industry Guidelines, Specifications and Procedures, Renewable Fuels Association, Revised October 2005, Washington, DC, USA
3. PNS/DOE FS 2-2005, Petroleum Products – Retail Outlet - Underground Storage Tank, Bureau of Product Standards, Department of Trade and Industry, Philippines

Enclosed is a copy of the said draft standards circulated to all concerned sectors for comments. It is suggested that any proposed change to the provisions shall be supported with technical explanations/justifications. We appreciate receiving your comments on or before June 8, 2010. Non-receipt of your comments on the specified date shall be construed as concurrence to the draft PNS.


Thank you for your usual cooperation

Very truly yours,



ZENAIDA Y. MONSADA

Chairman -Technical Committee on
Petroleum Processes and Facilities
Director - Oil Industry Management Bureau



rcp/ZGL/ADYL

DRAFT PHILIPPINE NATIONAL STANDARD
Storing and handling of e-gasoline in retail outlets

DPNS/DOE FS _____

1 Scope

2 Reference

3 Definition

For the purpose of this standard, the following definitions shall apply :

Base gasoline

refers to unleaded gasoline that shall be blended with fuel bioethanol to produce E-gasoline.

Bioethanol

refers to ethanol, produced from a variety of feedstock such as grains, agricultural wastes, and other biomass resources

Certificate of Quality

this is the document describing the quality of E10 and E10-blends. It contains the result of tests made by the supplier's of E10 laboratory of all the properties listed in the PNS specification of E10 or E10-blends.

Ethanol (ethyl alcohol) –

in its pure form is a clear, colourless liquid alcohol which can be used as an alternative fuel. It can be produced from gasoline by industrial methods or derived from corn, wheat, potato wastes, cheese whey, rice stew, sawdust, urban wastes, paper mill wastes, molasses, sugar cane, seaweed, surplus food crops, and other cellulose waste.

E-10 (E-gasoline)

refers to base gasoline blended with 10% fuel bioethanol as defined under PNS/DOE QS 008:2009 – E-gasoline Fuel.

Fuel bioethanol

refers to the bioethanol denatured with unleaded gasoline for use as blending component to unleaded gasoline, as provided in the PNS/DOEQS 007:2005 - Anhydrous Bioethanol Fuel.

51 **Laboratory**
52 a generalized term for other laboratory firm / facility accredited with and authorized
53 by Depot for the conduct of tests on product samples from terminals / depots.
54 Selection of laboratory for the testing of each terminal / depot's samples is subject to
55 proximity, transport turnaround and cost consideration
56

57 **Shall**
58 indicates provision that is mandatory
59

60 **Should**
61 a provision that is highly recommended but not mandatory
62

63 **Supplier**
64 refers to the company or firm from which the bioethanol requirements are to be
65 sourced; this also refers to their plant or facility from which the bioethanol is to be
66 sourced.
67

68

69 **4 General Requirements**

70

71 **4.1 E10 characteristics**

72

73 **Affinity to Water**

74

75 The ingress of water into an E10 storage tank, results in the separation of bioethanol
76 from the gasoline (phase-separation). The amount of water tolerated by an E10 vary
77 both with the ethanol content and temperature. Meaning the lower the blend
78 content, the lower is the tolerance for water, and the lower the temperature, the
79 lower is the tolerance for water.
80

81 **Testing for Water**

82

83 Not all water detection pastes are effective in the presence of ethanol. Advice
84 should be sought from the manufacturer or supplier that the paste is appropriate for
85 alcohol blend fuels. If water or a water/ethanol phase is found to be present at the
86 bottom of a tank, it should be pumped out immediately. Care should be taken with
87 this water, or water/ethanol as it may be flammable and toxic.
88

89 Discharge of water/ethanol phase mix into sewers, drains or waterways is not
90 allowed. Therefore disposal of any water/ethanol phase or off-specification mixture
91 must be done in accordance with local regulatory guidelines, possibility necessitating
92 the disposal of the contaminated fuel at a licensed chemical disposal facility.
93

94 It is also recommended that the residual fuel in the tank be tested for quality, to
95 establish if separation of all or part of the ethanol has resulted in an off-specification
96 mixture – if so, this should be pumped out and replaced with a fresh ethanol blend.
97 Pending on actual quality test on acceptability of the E10 product, the entire product
98 in the storage tank for E10 shall not be sold to the market. Correspondingly, the E10
99 dispensing pump shall be marked "**out of order**".
100

101 **Vapour Pressure**

102

103 Although ethanol has a lower vapour pressure than gasoline, a blend of ethanol and
104 gasoline tends to disproportionably increase the vapour pressure which is dependent
105 on the blend mix. Therefore it is strongly recommended to review vent design and
106 configurations to prevent unnecessary emissions to atmosphere.

107

108 **Solvent Properties**

109

110 Ethanol has very good solvent properties, and its presence in E10 tend to loosen
111 rust, scale gum and other deposits in tanks and fuel systems. It is therefore
112 important to ensure the removal of rust and other particles, particularly in steel tanks
113 and associated piping, and the condition of the infrastructure prior to using them for
114 ethanol blended fuels.

115

116 **4.2 Material compatibility**

117

118 Precaution is required when assessing an existing facility being considered for the
119 storage and dispensing of E10. Like gasoline, ethanol is a flammable liquid and
120 therefore the tank design and maintenance requirements shall comply with the
121 provisions of all applicable requirements, guidelines and standards including AS
122 1692 "Steel tanks for flammable and combustible liquids" and AS 1940 "The storage
123 and handling of flammable and combustible liquids".

124

125 The use of steel tanks and pipe-work is considered suitable for the storage and
126 distribution of E10. However, there is a slight increased risk of corrosion associated
127 with the presence of water should water separation phase occur or if water is
128 allowed to accumulate at the bottom of the tank; and as E10 is more conductive than
129 gasoline, there is a possibility of a slight increase of potential galvanic and
130 electrolytic corrosion.

131

132 In the case of fiberglass reinforced plastic tanks and pipe-work or tanks with
133 coatings/linings and pipe-works, confirmation should be obtained from the
134 manufacturer of the tanks and pipe-work as to the compatibility with E10.

135

136

137 **5 Underground storage tanks**

138

139 **Design Performance - refer to PNS/DOE FS 1-4 2005 - Retail Outlet**

140

141 In addition to the provisions of PNS/DOE FS 1-4 2005 – Retail Outlet, the following
142 shall also be included:

143

144 a. **Fiberglass tanks.** A clean, self-compacting, pea gravel (naturally rounded
145 river gravel of nominal size 4.75 to 19mm) approved by tank manufacturer,
146 should be used to bed and backfill around the fiberglass tank. Washed,
147 crushed stone or gravel of nominal size 4.75 to 13.2mm may also be used.

148

149 b. Fill and discharge lines shall enter tanks only through the top. Fill lines shall
150 be sloped towards the tank. Underground tanks for gasoline products having

151 a capacity of more than 3785L (1000 gal) shall be equipped with a tight fill
152 device connecting the fill hose to the tank. The fill pipe and dip stick pipe shall
153 be provided with a liquid-tight cover to prevent any water intrusion.

154
155 c. Water may enter into the primary tank from loose tank top fittings. Usually
156 water is detected by periodically wiping water-finding paste suitable for use
157 with E10 into the bottom of the tank dip stick. A change of color will indicate
158 the depth of water present.

159
160 d. Steel Tanks - Tanks shall be constructed from rolled carbon steel plate,
161 welded together to meet the requirements of UL 58-1993 standard. The outer
162 surface shall have all external sharp corners, burrs and weld pinnacles
163 removed, then be abrasive blast-cleaned to SA 2.5 or equivalent. The entire
164 external surface of the tank shall be painted with a primer then coated with an
165 approved bitumen/asphalt-based coating at 10 mils dft.

166
167 Per API Recommended Practice 1626, internally lined steel tanks may not be
168 suitable for conversion to storage of ethanol and E10.

169 170 171 **6 Piping systems**

172 173 **Design**

174 175 **6.1 Materials**

176
177 **6.1.1** The following kinds of underground piping systems available for use:

178
179 **6.1.1.1 Fiberglass-reinforced plastics (FRP)** – These are pipes made out of
180 layers of fiberglass and resins. Any FRP pipe used in underground
181 gasoline installation should be listed for products to be conveyed. It is
182 important that manufacturer's installation instructions are followed.

183
184 **6.1.1.2 Coated steel piping** – These are Schedule 40 min., steel pipe, protected
185 against external corrosion, either through corrosion protection or other
186 approved means. Couplings and fitting shall be made out of malleable
187 iron and rated to handle at least 150 psi. Thread sealants certified for
188 gasoline service should be used for all fittings. Use NPT threads.

189
190 **6.1.1.3 Flexible piping** – These are pipes characterized by non-corrosive
191 materials, flexibility and no inaccessible joints. The piping may either be
192 direct burial (single wall or double wall) or replaceable through an outer
193 shell. Flexible pipe used in underground gasoline installations should be
194 certified for products to be conveyed. It is important that manufacturer's
195 installation instructions are followed.

196
197 **6.1.1.4** High Density Polyethylene PE-80 (HDPE) pipings should be installed
198 according to manufacturers' specifications.

199 **6.2** For the above ground portion of the vent line, uncoated steel pipes can be
200 used. In no instance shall the uncoated pipe of the vent line be used
201 underground.
202

203 **6.3** Corrosion Protection – All metallic underground piping should be protected
204 from corrosion induced by the surrounding earth material around the pipe.
205 The corrosion protection options for the piping can either be of the following:
206

207 **6.3.1** Properly engineered, installed and maintained corrosion protection system in
208 accordance with standards design of:
209

- 210 i American Gasoline Institute Publication 1632-1996, *Cathodic Protection*
211 *of Underground Storage Tanks and Piping Systems*;
- 212 ii Underwriters Laboratory of Canada ULC-S603.1M, *Standard for*
213 *Galvanic Corrosion Protection Systems for Steel Underground Tanks for*
214 *Flammable and Combustible Liquids*;
- 215 iii Steel Tank Institute Standard no. sti-P3, *Specification and Manual for*
216 *External Corrosion Protection of Underground Steel Storage Tanks*;
- 217 iv National Association of Corrosion Engineers Standard RP-01-69,
218 *Recommended Practice, Control of External Corrosion of Underground*
219 *or Submerged Metallic Piping Systems*;
- 220 v National Association of Corrosion Engineers Standard RP-02-85,
221 *Recommended Practice, Control of Corrosion on Metallic Buried, or*
222 *submerged Liquid Storage Systems*; and,
- 223 vi Underwriters Laboratories Inc., *Standard for External Corrosion*
224 *Protection Systems for Steel Underground Storage Tanks*, UL 1746-
225 1993, Part 1.
226

227 **6.3.2** Approved or Certified corrosion-resistant materials or system, which include
228 alloys, fiberglass-reinforced plastics, or fiberglass-reinforced plastic coatings.
229
230

231 **7 Dispensing Pumps and Apparatus**

232

233 **7.1 Fuel Dispenser**

234

235 Any type of fuel dispensers either gear type, piston type, and vane type or
236 equivalent as long as the materials used are compatible with E10.
237

238 For pumps where E10 is used, pump seals should be either carbon or
239 ceramic. If unsure, check with the pump supplier for the following
240 precautions:
241

- 242 a. higher levels of ethanol may damage elastomers in seals, diaphragms and
243 other components;
- 244
- 245 b. aluminum, brass and zinc-plated components may be affected;
- 246
- 247 c. nozzles constructed of at Elaflex ZVA may be damaged by ethanol content
248 exceeding 10%;

249 If the operator or maintainer are unsure of the suitability of the equipment, it
250 is recommended to check with the supplier of pumps and dispensers for
251 information on compatibility with ethanol prior to the first delivery of E10, and
252 the potential effect on warranties.

253

254 **7.2 Pipe Sealants**

255

256 For pipes where E10 is in use, avoid alcohol base sealant. Suitable sealants
257 are:

258

- 259 • Scotch brand pipe sealant with Teflon # 4178,
- 260 • Locite pipe sealant Teflon # 592, and
- 261 • Permatex seals pipes #804 or similar industry approved products.

262

263 **7.3 Meters**

264

265 Internal o-rings and seals of meters intended for E10 should be designed to
266 withstand ethanol's action. When first converting to E10, it is advisable to
267 recalibrate meters after 10-14 days to ensure that the change of product has
268 not caused any meters to over-dispense.

269

270 **7.4 Filters**

271

272 Recommended filters for retail dispenser is 10 micron. When stations are first
273 converted to E10, the solvent action of the ethanol may loosen built up
274 lacquer on the tank walls and sediment in the bottom of the tank. This may
275 result in the need for a filter change shortly after conversion.

276

277 **7.5 Hoses**

278

279 Manufacturers of hoses for retail gasoline dispensers should indicate that their
280 hoses are suitable for E10.

281

282 **7.6 Nozzles**

283

284 The nozzle manufacturers should indicated that the product is suitable for use
285 with E10.

286

287

288 **8 Housekeeping and code of practice**

289

290

E10 Retail Outlet Operator Checklist

291

292

Investigatory/Preparatory

293

- 294 1. Verify tank and submersible pumps material compatibility.
- 295 2. Investigate tank water problems and apply corrective measures as necessary.
- 296 3. Check tightness of seals on fill caps and proper water runoff from manhole
297 covers.
- 298 4. Remove water bottoms (if present). Check for tilted tanks.

299 5. Clean tank bottom, if necessary.

300

301

Conversion Plan (before first delivery)

302

303 1. Equip pump or dispenser with 10 micron filter. (or "water slug" filter)
304 (Remember - SAFETY FIRST - SHUT OFF BREAKER)

305 2. Recheck for water bottoms and remove any present.

306 *Use only appropriate equipment in removing water from the tanks. Such*
307 *equipment should be intrinsically-safe and protected against static- discharge.*
308 *Cordon-off the affected tank area during removal of water*

309 3. Issue ethanol compatible paste. Discard any old incompatible pastes.

310 4. Procure proper pump labels.

311 5. Confirm any applicable accounting procedures.

312

313

First Delivery

314

315 1. Check for water. Water bottoms must be removed before first delivery of E10.

316 2. Follow normal delivery procedures and ensure that accurate tank gauge and
317 dispenser readings are taken.

318 3. Verify (with transport driver) correct compartment for correct tank.

319 4. Pumps should be shut down during initial delivery. (check company policy)

320 5. Purge lines from tanks to dispensers. (check company policy)

321 6. Install required decals and if necessary change octane decals. Also repaint
322 manhole covers to proper color code (e.g., API color code).

323 7. Fill tanks to at least 80% of capacity. Keep as full as possible for 7 to 10 days.

324 8. Test for water bottoms at the beginning of each shift for the first 48 hours after
325 initial delivery.

326

327

Regular Operations / Maintenance

328

329 1. Check for water. No water level is acceptable.

330 NOTE: Be sure that you are using a water finding paste suitable for use with
331 E10.

332

333 Dipping for water shall be carried out on tanks containing E10 daily as part of
334 the regular daily stock dip. Any sites that do not currently dip all tanks daily
335 MUST introduce daily stock/water dip to tanks containing E10.

336

337 Do not dip when it is raining

338

339 Use specific water finding pastes for E10. The water finding paste for E10
340 does work in both water and water/ethanol mixtures and can be used for all
341 fuel tanks.

342

343 2. The covers for the fill pipe and dip stick pipe shall be regularly maintained for
344 proper operations and shall be properly locked-in place by the station
345 personnel.

346

- 347 Open fill point cover and check if in good condition and seal is intact.
348 Improperly sealed covers may allow water to enter the underground storage
349 tank.
350
- 351 3. Check for water bottoms daily.
352
 - 353 4. Notify designated personnel if water is detected and have it removed at once.
354 Pending an actual quality test on acceptability of the E10 product, the entire
355 product in the storage tank for E10 shall not be sold to the market.
356 Correspondingly, the E10 dispensing pump shall be marked "out of order".
357
 - 358 5. Records of water dips shall be kept in a daily recoverable record system e.g.
359 logbook or Wet Stock Management Record. Records shall show time of dip
360 and shall be initialed by the site manager or the person doing the dip.
361
 - 362 6. Replace filters if pump/dispenser is running slow. When stations are first
363 converted to E10, the solvent action of the ethanol may loosen built up
364 lacquer on the tank walls and sediment in the bottom of the tank. This may
365 result in the need for a filter change shortly after conversion. (*Provide*
366 *statement on effects of water on filter vis-à-vis product flow.*)
367
 - 368 7. Check pump calibration two weeks after initial load conversion. When first
369 converting to E10, it is advisable to recalibrate meters after 10-14 days to
370 ensure that the change of product has not caused any meters to over-
371 dispense.
372

373 **8.1 Material Safety Data Sheets**

374

375 Material Safety Data Sheets (MSDS) should be provided for all personnel who work
376 with ethanol, as with other gasoline fuels. MSDS's should be provided by ethanol
377 suppliers. Similarly, personnel who work with E10 should be provided with MSDS's
378 for the fuel.
379

380 **8.2 Environmental considerations**

381

382 Due to its solubility in water and its chemical properties, ethanol will biodegrade
383 quickly in water and soil. In water, the half life of ethanol is only a few hours. The
384 very fact that ethanol biodegrades is a bonus, however because of the gasoline
385 component left behind, all fuel storage systems (tanks and pipe-work) should be
386 monitored to detect any leaks quickly. Any consideration to the refurbishment of E10
387 storage tanks or new facilities must include a condition assessment and such
388 refurbishment work must comply with AS 1692 "Steel tanks for flammable and
389 combustible liquids" and AS 1940 "The storage and handling of flammable and
390 combustible liquids".
391

392 **8.3 Fuel Quality**

393

394 All care must be taken to ensure there is no water present in the storage tank and
395 piping. It is equally important to ensure that upon receiving E10, it is within fuel
396 specification. Out of specification E10, for whatever reason, should not be accepted.

397 **8.4 Maintenance**

398

399 The maintenance of the E10 fuel tanks should comply with the provisions of AS 1692
400 and AS 1940 for the use, storage of E10 and the maintenance of the storage
401 facilities. While general requirements for E10 is no different to what is required for
402 gasoline, additional consideration should be given to the following:

403

- 404 a. Ingress of water into the tanks;
405 b. Cross contamination from water, fuel or diesel;
406 c. Compatibility of materials; and
407 d. Rust and scale contamination of pumps and filters.

408

409

410 **9 Fire Prevention / Fire Fighting / Fire Control**

411

412 **9.1 Fires Involving E10**

413

414 Ethanol burns with a colourless flame, and may generate little or no smoke, making it
415 difficult to determine the existence or the boundaries of its fire. In contrast, E10
416 burns with the flame colour of the base gasoline fuel. The addition of ethanol to
417 gasoline leads to a moderate increase in the upper flammability limits.

418

419 Spill fires (less than 5 mms depth) and in-depth fires can be extinguished with
420 aqueous film forming foams, polar solvent foams, fluoroprotein foams. However, in
421 spill fires there is an additional regular protein foams that shall be included to
422 extinguish fires. Sub-surface foam injection is not recommended.

423

424 Accordingly,

425

- 426 ▪ Assure that all fire protection system are regularly tested and maintained by
427 qualified person, as required by a local regulation.
428
429 ▪ Keep records of protection system inspection and servicing. Maintain a Material
430 Safety Data Sheet (MSDS) on file for each of the extinguishing agents used.
431
432 ▪ Educate/train employees upon hire and annually thereafter, so they know how to
433 properly use the systems. Education training must be documented and the
434 records must be maintained on file. Employers may utilize extinguisher or service
435 contractor.

436

437 **9.2 Fire Extinguishers**

438

- 439 ▪ Fire extinguishers are essential for proper response to certain emergency
440 situation.
441
442 ▪ All portable fire extinguishers shall be operational and in good condition
443
444 ▪ Locate fire extinguishers at identified, designated places so that they are
445 readily accessible and immediately available in the event of fire

446

- 447 ▪ There shall be one (1) 20 lbs. type ABC/Foam type fire extinguisher to be
448 provided for every 7.5 m. horizontal radius for every influence area
- 449
- 450 ▪ An influence area shall refer to the dispenser pump, underground fill pipe
451 opening and lubrication or service room
- 452
- 453 ▪ There shall be one (1) fire extinguisher for every pump island for multiple
454 pump islands retail outlet
- 455
- 456 ▪ Do not block fire extinguishers with obstacles or hide from view
- 457
- 458 ▪ Whenever an extinguisher has been used, or there is question whether it has
459 been used, take it out of service and immediately replace it with an
460 operational service unit.
- 461
- 462 ▪ Identify the used extinguisher as “out of service” and place it in a designated
463 location until maintenance and recharging is performed
- 464
- 465 ▪ It is good practice to visually inspect fire extinguisher daily to ensure they are
466 in their designated places, and ready for use
- 467
- 468 ▪ Provide for visual monthly inspections of fire extinguishers to detect any
469 physical damage, corrosion and other impairments
- 470
- 471 ▪ Provide for thorough annual maintenance check-up by qualified service
472 personnel, including internal inspection of non stored pressure extinguishers
- 473

474 **9.3 Housekeeping and Storage of Flammable and Combustible Liquids**

- 475
- 476 ▪ Maintain all retail outlets in a clean condition as the nature of the work allows
- 477
- 478 ▪ Good housekeeping and general appearance is important to safe operation
- 479
- 480 ▪ The safe and proper storage of flammable and combustible liquids in a retail
481 outlet is guided by the internationally accepted standards such as the Uniform
482 Fire Code; NFPA 30-1996, and NFPA 30A-1196, Automotive and Service
483 Station Code; and regulated by the Fire Code of the Philippines, Philippine
484 Electrical Code, National Building Code, Occupational Safety and Health
485 Standards etc.
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Table 1
Compatibility of Commonly Used Materials with Ethanol and E10

Recommended	Not Recommended
Metal	Metal
- Aluminum (not for E85)	- Zinc - galvanized (ethanol only)
- Carbon Steel	
- Stainless Steel	
- Bronze	
Elastomers	Elastomers
- Buna-N (hoses & gaskets) (Note 1)	- Buna-N (seals only) (Note 1)
- Fluorel (Note 1)	- Neoprene (seals only)
- Fluorosilicone (Note 2)	- Urethane rubber
- Neoprene (hoses & gaskets)	
- Polysulfide rubber	
- Natural rubber (ethanol only)	
- Viton (Note 1)	
Polymers	Polymers
- Acetal	- Polyurethane (Note 2)
- Nylon	- Alcohol-based pipe dope (recently applied) (Note 2)
- Polypropylene	
- Teflon (Note 1)	
- Fiberglass reinforced plastic (Note 2)	

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NOTES :

1. Registered Trademark
2. The manufacturer of the specific material should be consulted

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522
523

Table 2
Fuel Dispensing/Outlet Checklist to Receive Gasoline/E10

Step One – Site Investigation and Preparation	
Check point	Action
Tank compliance	<ul style="list-style-type: none"> Review regulatory compliance and suitability for E10
Tanks, (tank linings) and pipe-work	<ul style="list-style-type: none"> Verify tank material compatibility with the E10 Check history of tanks for signs of water ingress and repair. Investigate tank water problems and correct.
Fill point and dip point	<ul style="list-style-type: none"> Ensure tight seals on fill caps and ensure proper water run off from manhole covers. Correct where necessary Ensure that product and water does not drain from the fill box via the foot valve into a tank holding E10.
Fill point marker	<ul style="list-style-type: none"> Change fill point marker to clearly identify E10 fuel.
Vent tubes	<ul style="list-style-type: none"> Check vent for ingress of water and are clear of rubbish and debris.
Tank preparation	<ul style="list-style-type: none"> Remove water from tank, clean and dry out tank. (The tank must be cleaned of loose materials, rust, varnish and gum). I also suggest check lead from lead fuels impregnated into the steel lining be carried out.
Step Two – Conversion Plan	
Pumps, hoses, nozzle and meters	<ul style="list-style-type: none"> Check with pump manufacture that the dispenser/hose and nozzle can handle E10 Equip pump or dispenser pumps with 10 micro filter to remove any suspended particulates and precipitates.
Tanks dewatering	<ul style="list-style-type: none"> Recheck for water in the tanks and remove.
Tanks dips	<ul style="list-style-type: none"> Issue Ethanol compatible pastes and discard old incompatible pastes.
Meters	<ul style="list-style-type: none"> Note recalibrate after 10 to 14 days of operation to ensure that the change of product has not caused any meters to over dispense (only applicable if selling the product or recording volumes issued).
Step Three – First Delivery	
Tanks dewatering	<ul style="list-style-type: none"> Check for water in tanks. The water must be removed before first delivery

	<ul style="list-style-type: none"> • Test for water in the tanks (water bottoms) at least three times a day (24 Hrs) or at the end of each shift for the first 48 hours after initial delivery. • Then check for water bottoms daily.
Pump labels	<ul style="list-style-type: none"> • Ensure correct proper pump labels are fitted.
Delivery	<ul style="list-style-type: none"> • Follow standard delivery procedures. • Hoses and piping must be purged to avoid the risk of cross contamination • Verify with tanker driver correct compartment for correct tank. • Fill tanks to 80% of capacity. Keep as full as possible for 7 to 10 days
Pumps	<ul style="list-style-type: none"> • Pumps should be shut down during first delivery • Replace pump/dispenser filters if running slow
Step Four – On-going procedures and maintenance requirements	
Delivery	<ul style="list-style-type: none"> • To avoid the possibility of water contamination and where possible, deliveries should not be made during periods of rain • The operator should check the hardstand area of the dispensing facility to ensure there is no freestanding water around the dip and filling points.
Maintenance	<ul style="list-style-type: none"> • Follow standard maintenance requirements including daily for water bottom checks. If water is found, have it removed at once. • Inspect pumps daily for signs of leaks caused by material incompatibility with ethanol. If a leak is found shut down the pump and repair immediately. Check pump calibration two weeks after initial delivery of ethanol blend. • Filters/strainers on pumps and pipes should be checked regularly – for example every two months – for rust or scale cleaned from the system by the ethanol. Note once the tanks and pipes have been properly prepared for ethanol use, further rust or scale is less likely to occur. • Leaks and spills of E10 should be handled in the same way as gasoline leaks and spills.

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529 **References :**

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- 531 1. Ethanol Blended Unleaded Petrol (E10) Storage Tank Conversion, Facilities
532 Maintenance Instruction No. 6, 2006