



Ministry for the
Environment
Manatū Mō Te Taiao

**Guidelines for Assessing
and Managing Petroleum
Hydrocarbon
Contaminated Sites in
New Zealand (Revised
2011)**

MODULE 4

Tier 1 soil acceptance criteria

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Table 4.15 Tier 1 soil acceptance criteria for TPH^(1,3,5,6) Agricultural use ALL PATHWAYS
(all values in mg/kg)

Soil Type/ Contaminant	Depth of contamination		
	Surface (<1m)	1m - 4m	> 4m
SAND			
C ₇ -C ₉ ⁽⁴⁾	120 ^(m)	120 ^(m)	(3,800) ^(r,s,v)
C ₁₀ -C ₁₄	58 ^(x)	(560) ^(r,x)	(650) ^(r,x)
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾
SANDY SILT			
C ₇ -C ₉ ⁽⁴⁾	(500) ^(r,m)	(500) ^(r,m)	(3,800) ^(r,v)
C ₁₀ -C ₁₄	58 ^(x)	(670) ^(r,x)	(4,900) ^(r,v)
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾
SILTY CLAY			
C ₇ -C ₉ ⁽⁴⁾	(2,700) ^(r,v)	(7,300) ^(r,v)	(19,000) ^(r,v)
C ₁₀ -C ₁₄	58 ^(x)	(2,700) ^(r,x)	(8,900) ^(r,x)
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾
CLAY			
C ₇ -C ₉ ⁽⁴⁾	(15,000) ^(r,v)	NA ⁽²⁾	NA ⁽²⁾
C ₁₀ -C ₁₄	58 ^(x)	(2,900) ^(r,x)	(9,700) ^(r,x)
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾
PUMICE			
C ₇ -C ₉ ⁽⁴⁾	(810) ^(r,m)	(810) ^(r,m)	(4,800) ^(r,v)
C ₁₀ -C ₁₄	58 ^(x)	(1,100) ^(r,x)	(1,800) ^(r,x)
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾
PEATS AND HIGHLY ORGANIC SOILS			
C ₇ -C ₉ ⁽⁴⁾	(6,700) ^(r,m)	(6,700) ^(r,m)	NA ⁽²⁾
C ₁₀ -C ₁₄	58 ^(x)	NA ⁽²⁾	NA ⁽²⁾
C ₁₅ -C ₃₆	(4,000) ^(r,x)	NA ⁽²⁾	NA ⁽²⁾

NOTES:

- Criteria for C₁₀ - C₁₄ and C₁₅ - C₃₆ are based on consideration of aliphatic component of TPH measurement and consideration of TPH as a surrogate measure for PAH, consideration of PAHs completed by extrapolation of PAH content of diesel and PAH criteria (refer Table 4.10)
- NA indicates estimated criterion exceeds 20,000 mg/kg. At 20,000 mg/kg residual separate phase is expected to have formed in soil matrix. Some aesthetic impact may be noted.
- Based on protection of human health only. Site specific consideration of aesthetic and ecological impact is required.
- Based on health effects associated with aliphatic component only. Separate consideration of the health effects associated with the aromatic component (i.e. BTEX) is required.
- Soil acceptance criteria are based on the lower value of criteria based on volatilisation (Table 4.16), other pathways (Table 4.18), criteria for the protection of maintenance workers (Table 4.19) and TPH criteria developed as surrogates for PAHs (Table 4.22). Surface soils criteria are based on all three pathways, criteria for soils at 1 m are based on volatilisation and maintenance workers, and criteria for soils at 4 m are based on volatilisation only. PAH surrogate considerations apply at all depths.
- The following notes indicate the limiting pathway for each criterion: v - Volatilisation, s - Soil Ingestion d - Dermal, p - Produce, m - Maintenance/Excavation, x - PAH surrogate
- Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons. For further explanation refer to Appendix 4M.
- Due to the nature of boundary conditions in volatilisation model, calculated criteria for sandy soils are higher than that for silt soil type. Therefore, the criteria for sand are set equal to the criteria for silt. Refer Appendix 4D for details.