

Proposed by S. Charoenpong, 1973  
Revised by :  
P. Vijarnsorn and staffs, 1988  
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## NA THON SERIES

Field Symbol: Ntn

**Distribution:** Occupies moderate extent in Peninsular Thailand and some areas in Southeast Coast of Thailand.

**Setting:** Na Thon soils derived from fine grain clastic rocks namely shale, phyllite or equivalent rocks and occurred on denudation surface. Relief is undulating to rolling. Slope ranges from 5 to 20 percent. Elevation ranges from 30 to 100 m above mean sea level. The climate is Tropical Monsoon (Koppen 'Am') or Tropical Rain Forest (Koppen 'Af'). Average annual precipitation is 2,000 mm Average annual air temperature is from 26°C to 28°C.

**Drainage, Permeability and Surface Runoff:** Drainage is well drained, permeability is estimated to be moderate and surface runoff is medium or rapid depending upon slope. Ground water level falls very deep, below 2 m throughout the year.

**Vegetation and Land Use:** Originally under Tropical Evergreen Forest, now many parts were cleared and planted to para rubber oil palm and fruit trees.

**Characteristic Profile Features:** The Na Thon series is a member of the fine, mixed, semiactive, isohyperthermic Typic Haplohumults. They are moderately deep soils to bed rocks and are characterized by a dark brown or brown clay loam surface or A horizon overlying a strong brown and/or yellowish brown clay loam or clay argillic B horizon. These underlain by a mixed colors of brownish, yellowish and reddish silty clay or clay C horizons which occur approximately below 50 cm but within 100 cm from the soil surface. The mixed colors are resulted of weathering process of the parent rock. Rock fragments commonly occur in C horizon. Very strongly acid to strongly acid, reaction values range from 4.5 to 5.5 throughout the soil profile.

**Typifying Pedon:** Na Thon clay loam - para rubber plantation, 10 m above mean sea level, 3 to 5 percent slopes (sheet name King Amphoe Thung Wa, sheet number 4923 II, coordinate 780583).

**Profile Code Number:** S-67/151, described by Anon Pittayarak, 23 December 1974 (moist colors unless otherwise stated).

Horizon	Depth (cm)	Description
Ap	0-10	Yellowish brown (10YR5/4) loam; weak medium and coarse subangular blocky structure; friable, slightly sticky, and slightly plastic; common fine and very fine interstitial pores, few fine and very fine tubular pores; plentiful fine and medium roots; moderately acid (field pH 6.0); clear smooth boundary.
Bt1	10-17	Brown to strong brown (7.5YR5/4-6) clay loam; weak to moderate medium and coarse subangular blocky structure; friable, slightly sticky and slightly plastic; many moderately thick clay films on ped faces; common fine and very fine interstitial pores, few fine tubular pores; few fine and medium roots; strongly acid (field pH 5.5); gradual smooth boundary.
Bt2	17-40	Mixed brownish yellow (10YR5/6) yellowish red (5YR5/8) and red (2.5YR4/6) clay; moderate medium and coarse subangular blocky structure; slightly firm, sticky and plastic; many moderately thick clay films on ped faces; few fine and medium roots; very strongly acid (field pH 5.0); diffuse smooth boundary.
Bt3	40-87	Mixed brownish yellow (10YR6/6) and yellowish red (5YR5/8) clay; moderate fine and medium subangular blocky structure; friable, sticky and plastic; many moderately thick clay films on ped faces; common fine and very fine interstitial pores, few very fine tubular pores; few fine roots; very strongly acid (field pH 4.5); clear smooth boundary.

Cr 87-110 Mixed light yellowish brown to brownish yellow (10YR6/4-6) and red (2.5YR4/6) clay with shale fraction; structureless; friable, slightly sticky and plastic; the layer of weathered shale; very strongly acid (field pH 4.5).

Remark: Normally in agriculture area, low organic carbon content (Typic Paleudults).

**Typic Location:**

Name of village, Ban Na Thon, Amphoe Thung Wa, Changwat Satun.

**Range of Profile Features:**

The surface or A horizon is from 10 to 15 cm in thickness and has 10YR or 7.5YR hues, values 3 or 4 and chromas 2 or 4. Texture of clay loam may occur on eroded sites. Structure is weak and moderate fine subangular blocky. Very strongly acid to strongly acid, reaction values range from 5.0 to 5.5.

The argillic B horizon is commonly from 40 to 100 cm in thickness and has 10YR or 7.5YR hues, values 5 or 6 and chromas 6 or 8. The color of 5YR hue, values 4 or 5 and chromas 6 or 8 may mixed with the matrix color. Structure is moderate medium and coarse subangular blocky. Very strongly acid to strongly acid reaction values range from 4.5 to 5.5.

The C horizon is present at some depth between 50 to 150 cm from the soil surface. This is a weathering zone of parent rock as shown by a multicolored (brownish, yellowish and reddish colors) pattern. The soft rock fragments are commonly found within this horizon. Structure is massive or weak blocky. Very strongly acid to strongly acid, reaction values range from 4.5 to 5.0.

**Similar Soil Series:**

Khlong Teng series (Klt): fine-loamy, mixed, semiactive, isohyperthermic, shallow Typic Haplohumults, C horizon occurs within 50 cm from the soil surface.

**Principal Associated Soils:**

These include Khlong Teng, Khao Khat and Pak Chan series.

Khao Khat series (Kkt): clay-skeletal, kaolinitic, isohyperthermic Typic (Kandic) Plinthudults.

Pak Chan series (Pac): very-fine, kaolinitic, isohyperthermic Typic Palehumults.

## ANALYSIS RESULTS

Profile code No.: S-67/151

(oven dry basis)

Soil series: NaThon series (Ntn)

Lab No.	Depth (cm)	Horizon	Particle size distribution analysis (% by weight)							Texture		pH		CaCO <sub>3</sub> %	P, mg kg <sup>-1</sup> Bray 2	K, mg kg <sup>-1</sup> NH <sub>4</sub> OAc	
			USDA grading			Sand-fraction grading				Lab	Field	1:1 water	1:1 KCl				
			sand	silt	clay	vc	c	m	f	vf	result	estim <sup>n</sup>					
PF-289	0-10	Ap	14.0	63.5	22.5						sil	l	5.0	3.8	0.0	3.6	105
PF-290	10-17	Bt1	11.5	61.5	27.0						sil-sicl	cl	4.8	3.6	0.0	1.6	44
PF-291	17-40	Bt2	6.5	48.0	45.5						sic	c	4.8	3.6	0.0	2.0	32
PF-292	40-87	Bt3	9.0	40.5	50.5						c	c	5.2	3.7	0.3	2.8	38
PF-293	87-110	Cr	80.5	6.0	13.5						sl	-	4.5	4.0	0.0	3.7	62

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol <sub>(+)</sub> kg <sup>-1</sup> )										Base satur <sup>n</sup> (%)		ECEC cmol <sub>(+)</sub> kg <sup>-1</sup> (B+D)	Al KCl extr. cmol <sub>(+)</sub> kg <sup>-1</sup> (D)	Electrical conduct <sup>y</sup> (ECx10 <sup>6</sup> ) dS m <sup>-1</sup>
				Ca	Mg	K	Na	SUM cations (B)	Extr. acidity (A)	SUM (B+A)	CEC NH <sub>4</sub> OAc (C)	CEC 100g Clay	B/Cx100	(Bx100)/(B+A)				
													(B)	(B+A)				
0-10	2.2	2.11	0.11	0.50	0.30	0.20	0.20	1.20	11.1	12.30	8.8	39.1	14	10			0.16	
10-17	2.6	1.83	0.08	0.30	0.10	0.10	0.20	0.70	12.9	13.60	8.8	32.6	8	5			0.05	
17-40	2.9	1.03	0.05	0.30	0.10	0.10	0.20	0.70	14.4	15.10	11.4	25.1	6	5			0.03	
40-87	4.2	0.83	0.05	0.30	0.10	0.10	0.10	0.60	13.5	14.10	13.1	25.9	5	4			0.02	
87-110	0.8	1.02	0.05	0.50	0.40	0.10	0.20	1.20	2.9	4.10	2.5	18.5	48	29			0.09	

Surveyor: A. Pitayarak

Reported by: W. Sirichuaychoo

Date: Dec. 23, 1974

Date: Nov. 23, 1998