



การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย

สรุปผลการทดสอบ  
INSULATION OIL 1 EA.

บริษัท ตัน แอนด์ ซันส์ จำกัด

No.HVT DGA T5240291-01

การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย  
ฝ่ายบริหารจัดการสินทรัพย์ระบบส่ง  
26 มิถุนายน 2567



HIGH VOLTAGE TESTING DEPARTMENT  
ELECTRICITY GENERATING AUTHORITY OF THAILAND  
53 Moo 2 Charansanitwong Rd., Bang Krui, Nonthaburi 11130  
Tel. (662) 436 2942 Fax. (662) 436 2994

TEST REPORT

**Object** : Insulation Oil 1 EA.  
: บริษัท ตัน แอนด์ ซันส์ จำกัด  
**Customer** : บริษัท ตัน แอนด์ ซันส์ จำกัด  
**Address** : 2111 หมู่ 4 ซอยศรีบุญเรือง 2 ถนนเทพารักษ์ สมุทรปราการ 10270  
**Test date** : 20 May, 2024 - 12 June, 2024  
**No of pages** : 5  
**Test item(s)** :

- Moisture in Oil (ASTM D1533-20)
- Dielectric Strength (IEC60156-2018)
- Color (ASTM D1500-12(2017))
- Power Factor (IEC 60247)
- Furfural Analysis (ASTM D5837-15)
- Oxidation Inhibitor (ASTM D2668-07(2013))
- Dielectric Breakdown Impulse Voltage (D3300-12)
- Passivator (JIS C2101)
- Interfacial Tension (ASTM D971-12)
- Acid Number (ASTM D664-18e2)
- Corrosive Sulfur (ASTM D1275-15)
- Polychlorinated Biphenyls(PCBs)inoil(ASTM D4059-18)
- Viscosity (ASTM D445-19)
- Oxidation Stability Rotating Bomb (ASTM D2112-15)
- Relative Density (ASTM D4052)
- Dibenzyl disulfide(DBDS), (IEC 62697-1:2012)

**Reported by** : .....  
(Miss.Suwanna Kamthornjaroen)  
Administrative officer Level 7

**Checked by** : .....  
(Mr.Sonthaya Jenthanyakorn)

Head, Insulation Testing and Analysis Section

**Approved by** : .....  
(Mr.Ronachart Gatechompol)

Chief, High Voltage Testing Department

**Job No.** : T5240291-01  
**Issued Date** : 26 June, 2024  
**Issued by** : Insulation Testing And Analysis Section

The record of proving tests applies only to the specific sample tested.

This report shall not be reproduced except in full, without the written approval of EGAT's Insulation Testing and Analysis Section



### ผลทดสอบน้ำมันหม้อแปลง

ได้ทดสอบน้ำมันหม้อแปลงของ บริษัท ดัน แอนด์ ซันส์ จำกัด จำนวน 1 ตัวอย่าง (Dongnum ESTRAN T2-HI) ผลเป็นดังนี้

#### ผลคุณสมบัติความเป็นฉนวนของน้ำมัน (New oil 1 ตัวอย่าง)

ผลทดสอบ Color, Interfacial tension, Density at 20°C, Viscosity at 40 °C, Dielectric breakdown voltage (IEC 60156 gap 2.5 mm), Dielectric breakdown voltage (ASTM D1816 gap 1 mm), Dielectric breakdown impulse voltage, Dissipation factor (power factor) 90 °C, Oxidation stability rotating bomb, Polychlorinated biphenyls (PCBs), Corrosive sulfur, Neutralization number (acidity), Oxidation inhibitor content, Water content, Furans in insulating liquids, Dibenzyl disulfide content (DBDS) ตามแนบ

หมายเหตุ ผลการทดสอบจะถูกต้องและรวดเร็วข้อมูลของน้ำมันหม้อแปลงที่ส่งมาทดสอบ ต้องครบตาม SAMPLE IDENTIFICATION ที่ห้องทดสอบกำหนด





HIGH VOLTAGE TESTING DEPARTMENT  
ELECTRICITY GENERATING AUTHORITY OF THAILAND  
53 Moo 2 Charansanitwong Rd., Bang Kruai, Nonthaburi 11130

page 3/5

Recieve Date: 16 May, 2024

Company :

บริษัท ดัน แอนด์ ซันส์ จำกัด

Sampling Date: 15 May, 2024

Product :

DONGNAMESTRAN T2-HI

Test Date: 12 June, 2024

Oil Type :

New Oil [IEC]

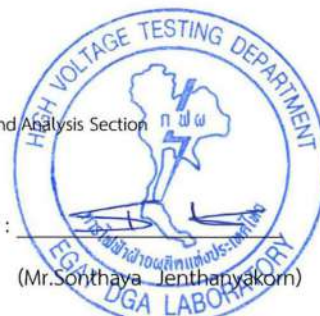
Job\_No. : T5240291-01

Type of Test	ASTM Method	New Oil Limit	Results
<b>Physical</b>			
Color, max:	ASTM D1500	0.5	0.1
Interfacial tension, mN/m min:	ASTM D971	40	51
Pour point °C, max	ASTM D97	-40	-
Density at 20°C, max:	ISO 12185	0.895	0.8490
Viscosity at 40°C, max	ISO 3104	12.0	8.4
<b>Electrical</b>			
Dielectric breakdown voltage,kV min	IEC60156	30	93
Dielectric breakdown impulse voltage,kV min	ASTM D3300	145	160
Dissipation factor (power factor), 90 °C, % max:	IEC 60247	- 0.005	- 0.0001
Conductivity,pS/m	IEC 61620	<0.05	-
Resistivity, min Gohm/m	ASTM D1169	60	
<b>Chemical</b>			
Oxidation stability, (BOMB), min, minutes	ASTM D2112	195	541
Oxidation inhibitor content max% by mass inhibited oil, %	- IEC60666	- 0.08 - 0.4	- 0.29
Corrosive sulfur,max:	ASTM D1275 (Copper)	Non Corrosive	2e (Non Corrosive)
Water content, mg/kg max	IEC 60814	30	13
Neutralization number (acidity),mg KOH/g max:	IEC 62021	0.01	0.01
Polychlorinated biphenyls (PCBs)	IEC 61619	Not Detectable	Not Detectable
Flash Point, min	ASTM D92	135	-
Furans in insulating liquids, mg/kg max	IEC 61198	0.25	Not Detectable
Passivator,	IEC60666	-	-
Total sulfur,ppm	ASTM D4294	-	-
Dibenzyl disulfide(DBDS),ppm	IEC62535	<5	Not Detectable

The record of proving tests applies only to the specific sample tested.

This report shall not be reproduced except in full, without the written approval of EGAT's Insulation Testing and Analysis Section

Checked by :



(Mr.Sonthaya Jenthanyakorn)

Head, Insulation Testing & Analysis Section



HIGH VOLTAGE TESTING DEPARTMENT  
ELECTRICITY GENERATING AUTHORITY OF THAILAND  
53 Moo 2 Charansanitwong Rd., Bang Kruai, Nonthaburi 11130

page 4/5

TEST REPORT

Receives Date : 16 May, 2024  
Sampling Date : 15 May, 2024  
Test Date : 8 June, 2024 - 8 June, 2024  
Test by : Miss. Chaninart Jarasboonpaisarn  
Job No. : T5240291.1-01

Receives from : บริษัท ดัน แอนด์ ซันส์ จำกัด  
Test Item : \*Dielectric breakdown voltage  
Test Method : ASTM D1816-12 (Gap 1 mm)

NO.	Location	Device Name	Serial No.	kV	Oil Type	Test(kV)					Limit*, min,(kV)	Mean (kV)	Appearance	Note	Range	120 % x Mean	Allowable Range	Oil Temp °C		Humidity %	Oil Tester NO
						1	2	3	4	5								Sampling	OIL		
1	DONGNAM	ESTRAN T2-HI			Mineral oil(New)	43.1	45.5	41.2	45.9	44.9	20	44	Liquid Clear Yellow		4.7	52.9	PASS	-	20	58.0	4

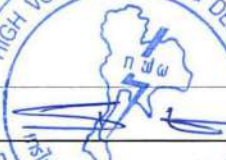
Remark : OilTeste\_NO1 = Megger OTS80AF/2 S/N 6410-835-050105/1595  
NO2 = Megger OTS80AF/2 S/N 4764710010497  
NO3 = Megger OTS100AF S/N 101229834  
NO4 = Megger OTS100AF S/N 101845290  
Limit\* : IEEE C57.106-2015


Allowable Range : 1 mm gap setting Range must be less than 120 % of the mean of the five (5) breakdown Voltages  
: 2 mm gap setting Range must be less than 92 % of the mean of the five (5) breakdown Voltages

\*This laboratory is not ISO/IEC 17025 accredited for the tests marked.

The record of proving tests applies only to the specific sample tested.

This report shall not be reproduced except in full, without the written approval of EGAT's Insulation Testing and Analysis Section

Checked by :   
(Mr. Sonthaya Jenthanyakorn)  
Head, Insulation Testing & Analysis Section





HIGH VOLTAGE TESTING DEPARTMENT  
ELECTRICITY GENERATING AUTHORITY OF THAILAND

page 5/5

53 Moo 2 Charansanitwong Rd., Bang Krui, Nonthaburi 11130

Tel. (662) 436 2942 Fax. (662) 436 2994

*End of report*



Job No. T5240291-01

The record of proving tests applies only to the specific sample tested.

This report shall not be reproduced except in full, without the written approval of EGAT's Insulation Testing and Analysis Section