

Приложение към ISO/IEC 17025:2005 Декларация  
за акредитация за регистрационен номер: **L 020**

на **KEMA Nederland B.V.**  
**High-Power Laboratory**

Това приложение е валидно: от **19-03-2015** до **01-04-2018** Заменя приложение с дата: **26-01-2015**

No.	Материал или продукт	Вид дейност <sup>1</sup>	Вътрешен референтен номер
17	Вентилни отводители	Тестове на нагнетяване	IEC 60099-1 IEC 60099-4 IEEE Std C62.11
18	Високоволтови А.С. изключващи комбинации предпазители за номинални напрежения 1 kV Ur и включително 52 kV	Making and breaking tests Tests on the mechanism	IEC 62271-105 IEEE Std C37.41
19	Токоограничаващи предпазители	Тестове на изключване	IEC 60282-1 IEC 60549 IEEE Std C37.41 ANSI C37.44
20	Експулсиращи предпазители	Тестове на изключване	IEC 60282-2
21	Високоволтови предпазители за приложения при моторни прекъсвачи	Тестове на изключване	IEC 60644
22	Оборудване за мрежи за пренос и разпределение на електрическа мощност	Тестове като споменатите в (1-16)	В съответствие с или еквивалентни На референтните методи като споменатите в (1-16).  IEC 61467 IEC 62067 IEC 61284

Annex to ISO/IEC 17025:2005 declaration  
of accreditation for registration number: **L 020**

of **KEMA Nederland B.V.**  
**High-Power Laboratory**

This annex is valid from: **19-03-2015** to **01-04-2018**

Replaces annex dated: **26-01-2015**

**Location where activities are performed under accreditation**

**Head Office**

Utrechtseweg 310, Building no. R11  
6812 AR  
Arnhem  
The Netherlands

No.	Material or product	Type of activity <sup>1</sup>	Internal reference number
1	Power Transformers	Short-circuit tests	IEC 60076-5 IEC 60076-11 EN 50464-1 IEEE Std C57.12.90 IEEE Std. C57.12.00
2	Current Transformers	Short-time current tests Transient instantaneous error measurement	IEC 61869-2 IEEE Std C57.13 IEC 61869-1
3	Reactors	Short-time current tests	IEC 60076-6 IEEE Std C57.21
4	Line traps for A.C. power systems	Short-time current tests	IEC 60353
5	Metal-enclosed A.C. switchgear 1 - 52 kV resp > 1 kV and prefabricated substations	Short-time current tests Verification of making and breaking capacities Mechanical operation tests Arcing due to internal fault	IEC 62271-200 IEC 62271-202 IEEE C37.74 IEEE Std C37.20.2 IEEE Std C37.20.7 ANSI C37.54 ANSI C37.55
6	Metal-enclosed A.C. switchgear >52kV	Short-time current tests Verification of making and breaking capacities Mechanical operation tests Arcing due to internal fault	IEC 62271-203 IEEE Std C37.122

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This annex has been approved by:

Ir. J.C. van der Poel  
Chief Executive

<sup>1</sup> If there is a referral to a scope (Sxxx), this constitutes a scheme of an accepted scheme owner. The accepted version is mentioned on the concerning scope of the scheme owner.

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Annex to ISO/IEC 17025:2005 declaration  
of accreditation for registration number: **L 020**

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**High-Power Laboratory**

This annex is valid from: **19-03-2015** to **01-04-2018**

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No.	Material or product	Type of activity <sup>1</sup>	Internal reference number
7	Low-voltage A.C. switchgear and control gear assemblies	Short-time current tests	IEC 61439-1 IEC 61439-2 IEC 60439-2
8	Insulation-enclosed A,C switchgear 1-52kV	Short time current tests Verification of making and breaking capacities Mechanical operation test Arcing due to internal fault	IEC 62271-201
9	High-voltage AC circuit breakers	Short-time current tests Making and breaking tests Switching tests Mechanical and environmental tests	IEC 62271-100 IEC 62271-110 IEC 62271-101 IEEE Std C37.09 IEEE Std C37.09a IEEE Std C37.09b IEEE Std C37.081
10	High-voltage generator Circuit breaker	Short circuit test	IEEE Std C37.013 IEEE Std C37.013a
11	AC circuit breakers for Railway applications	Making and Breaking test	EN 50152-1 IEC 60077-4
12	High-voltage A.C. switches for rated Voltages above 1 kVUp to and including 52 kV	Short-time current tests Making and breaking tests Mechanical endurance tests	IEC 62271-103
13	Alternating current switches for rated voltages of 52 kV and above	Short-time current tests Making and breaking tests Mechanical endurance tests	IEC 62271-104 IEEE Std C37.247
14	High-voltage A.C. disconnectors and earthing switches	Short-time current tests Switching tests Short-circuit making performance Operating and mechanical endurance tests Operation under severe ice conditions Operation at the temperature limits Contact zone tests	IEC 62271-102 IEEE Std C37.34
15	Alternating current contactors and motor starters	Making and breaking capacities Coordination with short-circuit protective device	IEC 62271-106
16	Automatic circuit reclosers and fault interrupters	Interruption tests Operating duty tests	IEC 62271-111 / IEEE Std C37.60

Annex to ISO/IEC 17025:2005 declaration  
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This annex is valid from: **19-03-2015 to 01-04-2018**

Replaces annex dated: **26-01-2015**

No.	Material or product	Type of activity <sup>1</sup>	Internal reference number
17	Surge arresters	Pressure-relief tests	IEC 60099-1 IEC 60099-4 IEEE Std C62.11
18	High-voltage A.C. switchfuse combinations for rated Voltages above 1 kV Up to and including 52 kV	Making and breaking tests Tests on the mechanism	IEC 62271-105 IEEE Std C37.41
19	Current limiting fuses	Breaking tests	IEC 60282-1 IEC 60549 IEEE Std C37.41 ANSI C37.44
20	Expulsion fuses	Breaking tests	IEC 60282-2
21	High Voltage fuse-links for motor circuit applications	Breaking tests	IEC 60644
22	Equipment for networks for transmission and distribution of electrical power	Test as mentioned above (1-16)	In accordance with or equivalent to the reference methods as mentioned above (1-16).  IEC 61467 IEC 62067 IEC 61284

Тримоментна МЧ

## NV предпазители Таблица за избор съгласно VDE 0670 T4 / IEC 60 282-1

Таблица за избор

Превод от английски език

NV back-up Предпазители съгл. VDE 0670 T4 / IEC 60 282-1 с контролирани загуби на мощност (ÜLA)

Таблица 7

Диапазон на номиналното напрежение на предпазителя [kV]		6/12		10/24	
Номинално работно напрежение на трансформатора [kV]		10		20	
Напрежение на к.с., %	Номинална мощност на трансф-ра [kVA]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]
U <sub>k</sub> = 4 %	50	2,9	10	1,5	4
	100	5,8	16 - 20	2,9	10
	125	7,2	20 - 25	3,6	10 - 16
	160	9,2	20 - 31,5	4,6	16 - 20
	200	11,5	25 - 40	5,8	16 - 20
	250	14,4	31,5 - 50	7,2	20 - 25
	315	18,2	40 - 63	9,1	20 - 31,5
	400	23,1	40 - 80	11,5	25 - 40
	500	28,9	50 - 100	14,4	31,5 - 50
U <sub>k</sub> = 5 %	630	36,4	63 - 100	18,2	40 - 63
	800	46,2	80 - 125	23,1	40 - 63
	1000	57,7	100 - 160	28,9	50 - 80
	1250	72,2	125 - 200	36,1	63 - 100

Предпочитаните стойности са показани в удебелен шрифт.

Таблица за избор

NV back-up Предпазители съгл. VDE 0670 T4 / IEC 60 282-1

Таблица 8

Диапазон на номиналното напрежение на предпазителя [kV]		3/7,2		6/12		10/24		20/36	
Номинално работно напрежение на трансформатора [kV]		6		10		20		30	
Напрежение на к.с., %	Номинална мощност на трансф-ра [kVA]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]	Номинален ток на трансф-ра [A]	Номинален ток на предпазителя [A]
U <sub>k</sub> = 4 %	50	4,8	16 - 20	2,9	10	1,5	4	0,96	2 - 6,3
	100	9,6	20 - 31,5	5,8	16 - 20	2,9	10	1,9	6,3 - 10
	125	12	25 - 40	7,2	20 - 25	3,6	10 - 16	2,4	10
	160	15,4	31,5 - 50	9,2	20 - 31,5	4,6	16 - 20	3,1	10
	200	19,2	40 - 63	11,5	25 - 40	5,8	16 - 20	3,8	10 - 16
	250	24,1	40 - 80	14,4	31,5 - 50	7,2	20 - 25	4,8	16 - 20
	315	30,3	50 - 100	18,2	40 - 63	9,1	20 - 31,5	6,1	16 - 25
	400	38,5	63 - 125	23,1	40 - 80	11,5	25 - 40	7,7	20 - 25
	500	48,1	80 - 160	28,9	50 - 100	14,4	31,5 - 50	9,6	20 - 31,5
U <sub>k</sub> = 5 %	630	60,6	100 - 200	36,4	63 - 100	18,2	40 - 63	12,1	25 - 40
	800	77,1	125 - 200	46,2	80 - 125	23,1	40 - 63	15,4	31,5 - 40
	1000	96,3	125 - 160	57,7	100 - 160	28,9	50 - 80	19,2	40 - 50
	1250	120,3	160 - 200	72,2	125 - 200	36,1	63 - 100	24,1	40 - 50
U <sub>k</sub> = 6,25 %	1600	154	200	92,4	125 - 200	46,2	80 - 100	30,8	50 - 63

Предпочитаните стойности са показани в удебелен шрифт.

# HV Fuse-Links

## Selection table acc. to VDE 0670 T4 / IEC 60 282-1

Selection table  
HV back-up Fuse-Links acc. to VDE 0670 T4 / IEC 60 282-1 with controlled power dissipation (ÜLA)

Table 7

Rated voltage range of the fuse-link [kV]		6/12			10/24	
Rated operating voltage of the transformer [kV]		10			20	
Rel. short-circuit voltage	Transformer rated output [kVA]	Transformer rated current [A]	Fuse-link rated current [A]	Transformer rated current [A]	Fuse-link rated current [A]	
U <sub>k</sub> = 4 %	50	2,9	10	1,5	4	
	100	5,8	16 - 20	2,9	10	
	125	7,2	20 - 25	3,6	10 - 16	
	160	9,2	20 - 31,5	4,6	16 - 20	
	200	11,5	25 - 40	5,8	16 - 20	
	250	14,4	31,5 - 50	7,2	20 - 25	
	315	18,2	40 - 63	9,1	20 - 31,5	
	400	23,1	40 - 80	11,5	25 - 40	
	500	28,9	50 - 100	14,4	31,5 - 50	
U <sub>k</sub> = 5 %	630	36,4	63 - 100	18,2	40 - 63	
	800	46,2	80 - 125	23,1	40 - 63	
	1000	57,7	100 - 160	28,9	50 - 80	
U <sub>k</sub> = 6.25 %	1250	72,2	125 - 200	36,1	63 - 100	
	1600	92,4	125 - 200	46,2	80 - 100	

Preferred values shown in bold print

Selection table  
HV back-up Fuse-Links acc. to VDE 0670 T4 / IEC 60 282-1

Table 8

Rated voltage range of the fuse-link [kV]		3/7,2		6/12		10/24		20/36	
Rated operating voltage of the transformer [kV]		6		10		20		30	
Rel. short circuit voltage	Transformer rated output [kVA]	Transformer rated current [A]	Fuse-link rated current [A]	Transformer rated current [A]	Fuse-link rated current [A]	Transformer rated current [A]	Fuse-link rated current [A]	Transformer rated current [A]	Fuse-link rated current [A]
U <sub>k</sub> = 4 %	50	4,8	16 - 20	2,9	10	1,5	4	0,96	2 - 6,3
	100	9,6	20 - 31,5	5,8	16 - 20	2,9	10	1,9	6,3 - 10
	125	12	25 - 40	7,2	20 - 25	3,6	10 - 16	2,4	10
	160	15,4	31,5 - 50	9,2	20 - 31,5	4,6	16 - 20	3,1	10
	200	19,2	40 - 63	11,5	25 - 40	5,8	16 - 20	3,8	10 - 16
	250	24,1	40 - 80	14,4	31,5 - 50	7,2	20 - 25	4,8	16 - 20
	315	30,3	50 - 100	18,2	40 - 63	9,1	20 - 31,5	6,1	16 - 25
	400	38,5	63 - 125	23,1	40 - 80	11,5	25 - 40	7,7	20 - 25
	500	48,1	80 - 160	28,9	50 - 100	14,4	31,5 - 50	9,6	20 - 31,5
U <sub>k</sub> = 5 %	630	60,6	100 - 200	36,4	63 - 100	18,2	40 - 63	12,1	25 - 40
	800	77,1	125 - 200	46,2	80 - 125	23,1	40 - 63	15,4	31,5 - 40
	1000	96,3	125 - 160	57,7	100 - 160	28,9	50 - 80	19,2	40 - 50
U <sub>k</sub> = 6,25 %	1250	120,3	160 - 200	72,2	125 - 200	36,1	63 - 100	24,1	40 - 50
	1600	154	200	92,4	125 - 200	46,2	80 - 100	30,8	50 - 63


Preferred values shown in bold print

Стр. 10/11 № 8



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9000 Варна; ПК 1501; тел. (052) 599 631, факс: (052) 599 632, varna@contragent.com  
Web site: www.contragent.com

## Дизайн на допълнителна табелка на предпазителя на български език

	<b>Предпазител СрН 10 / 24 kV</b>	
Стандарти	Номинално напрежение	Un = 20 kV
IEC 60282-1	Номинален ток	In = 16 A
VDE 0670/4	Макс.изключвателен ток	I1 = 63 kA
Сила на страйкъра : 80 N	Мин.изключвателен ток	Iz = 54 A
<b>Препоръчан за разпределителен трансформатор</b>		P = 160 kVA
Напрежение на късо съединение на трансформатора		Uk = 4%

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Информация № 9

**EFEN**

IN THE LINE OF POWER

Превод от английски език

Продукт: EFEN HV предпазители

Стандарт: IEC 60 282-1, EN 60 282-1, VDE 0670 T4

Производител: EFEN GmbH

**Инструкция за транспортиране, съхранение, сервис и поддръжка:**

#### Предпазители MV открит монтаж

Изпълняват изискванията на EN 60 282-1, за ток 2-200 A, и за напрежения от 6.12; и 10/24 kV.

#### Транспорт

Винаги се транспортира в тяхната оригинална опаковка. Местете внимателно, тъй като предпазителите са изработени от порцелан. Не изпускайте и не удряйте, защото това заплашва да разруши предпазителите.

#### Използване и съхранение

Разопаковайте внимателно предпазителите след пристигането им. Проверете за щети(счупени предпазители) по време на транспорта. Всяка щета трябва да се докладва незабавно на доставчика.

По време на сладирането защитете препазителите от щети, влага и мръсотия.

#### Условия на работа

Предпазителите MV са предназначени за работа при стандартни условия за открит монтаж както е определено от стандартите DIN EN 60947-1 и DIN EN 60439-1. Най-висока температура на ок. среда 40°C; Средната температура в продължение на 24 часа не трябва да надвишава 35 °C, най-ниска температура -25 °C, влажност 100% при 25 °C.

#### Монтаж

Монтират се в основи за предпазители за закрит или открит монтаж или в компактни SF6 КРУ или във въздушно изолирани подстанции.

#### Поддръжка

При нормални условия на работа техническото обслужване трябва да се извършва на всеки 10 години. По време на поддръжката се извършват следните работи :

Почистване на изолацията

Ако един от предпазителите е изгорял е силно препоръчително да се сменят също предпазителите и на другите фази.



**Product:** EFEN HV fuse-links

**Standard:** IEC 60 282-1, EN 60 282-1, VDE 0670 T4

**Manufacturer:** EFEN GmbH

**Instructions for transportation, storage, service and maintenance:**

## Outdoor MV fuses

These meet the requirements of EN 60 282-1, for current from 2 to 200 A, and for voltages of 6/12; and 10/24 kV.

## Transport

Always transport in its original packaging. Move with care, as fuses are made of porcelain. Do not drop and shock, because it threatens to destroy the fuse..

## Handling and storage

Unpack carefully the fuses after the arrival. Check for damages caused during the transport. Any damage should be reported immediately to the supplier.

During the storage protect the fuses from damages, humidity and dirt.

## Operating conditions

The MV uses are intended for operation under standard outdoor conditions as defined by the DIN-EN 60947-1 and DIN EN 60439-1. Highest ambient temperature 40°C; average temperature during 24 hours is not allowed to exceed 35 °C, lowest temperature -25 °C , humidity 100% at 25 °C.

## Assembly

Mounting into the fuse bases in outdoor or indoor conditions or in compact sized SF6 or air insulated substations.

## Maintenance

Under normal operating conditions maintenance works are to be carried out every 10 years. During the maintenance the following works are carried through:

Cleaning  
- insulators

If one of the fuses is blown out it is highly recommended to replace the fuses in other phase lines as well.



IN THE LINE OF POWER

Превод от английски език

Продукт: EFEN HV предпазители

Стандарт: IEC 60 282-1, EN 60 282-1, VDE 0670 T4

Производител: EFEN GmbH

Потвърждение: С настоящото потвърждаваме, че Предпазителите Високо Напрежение EFEN са проектирани, произведени и типово тествани съгласно споменатите по-горе стандарти. Освен това, извършваме изпитания свързани с производствения процес. Те са базирани на специфицираните стандарти и спецификации от нашата Система за управление на качеството съгласно DIN ISO 9001: 2000 която беше сертифицирана от DQS (Германско сдружение за сертифициране на системи за управление) в съответствие със стандартите по-горе.

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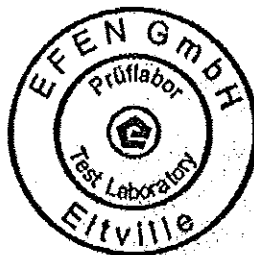
Слава Фаст  
Ръководител Инженерни приложения  
И Лаборатория  
Подписи

*M. Berkes*

Максимилиан Беркес  
Инженерни приложения

04.03.2015

Дата



**Product:** EFEN HV fuse-links**Standard:** IEC 60 282-1, EN 60 282-1, VDE 0670 T4**Manufacturer:** EFEN GmbH

**Confirmation:** Hereby we confirm that the EFEN High Voltage Fuse-Links are designed, produced and type tested according to the standards mentioned above. Furthermore, we perform tests associated with the manufacturing process. They are based on standards specifications and specifications of our Quality Management System according to DIN ISO 9001: 2000 which has been certified by the DQS (German association for the Certification of Management Systems) to comply with the above standards.

*Fast*

Slava Fast  
Head of Applications Engineering  
and Laboratory  
Signatures

*M. Berkes*

Maximilian Berkes  
Applications Engineering

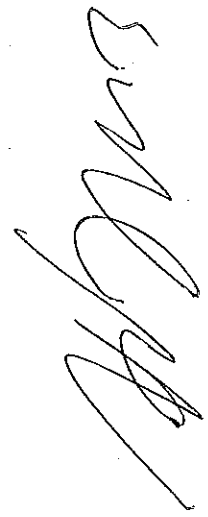
04.03.2015

Date

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**Продукт:** EFEN HV предпазители**Стандарт:** IEC 60 282-1, EN 60 282-1, VDE 0670 T4**Производител:** EFEN GmbH

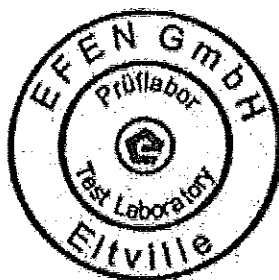
**Потвърждение:** С настоящото потвърждаваме, че по-горе споменатите HV предпазители са типово изпитани по стандартите споменати по-горе. Предпазителите могат да бъдат използвани като аксесоари в КРУ за трансформатори.

*Fast*

Слава Фаст  
Ръководител Инженерни приложения  
Подпис

26.11.2015

Дата

*218*

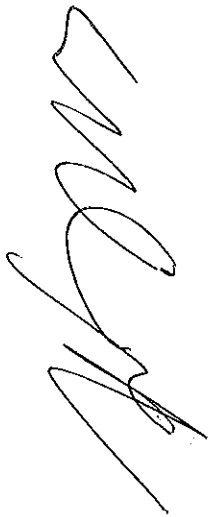
IN THE LINE OF POWER

**Product:** EFEN HV fuse-links

**Standard:** IEC 60 282-1, EN 60 282-1, VDE 0670 T4

**Manufacturer:** EFEN GmbH

**Confirmation:** We hereby confirm that the above mentioned HV fuse-links are type tested according to the standard mentioned above. The fuses can be used in switchgears for transformer accessory.

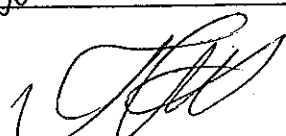
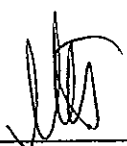


*Fast*

Slava Fast  
Head of Applications Engineering  
Signatures

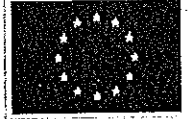
26.11.2015

Date



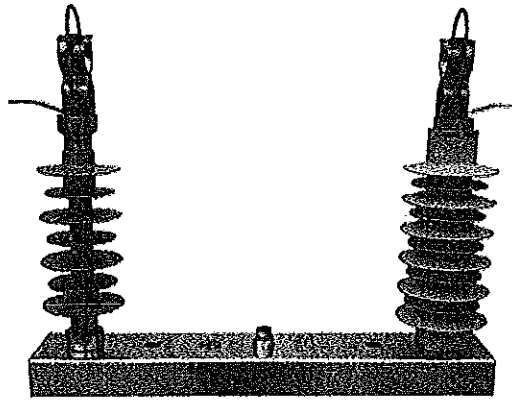
-219-

*Trpurostvenne №12*



- 1-24 KV INDOOR EPOXY INSULATORS
- 1-38 KV OUTDOOR EPOXY INSULATORS
- 25-38 KV COMPOSITE INSULATORS
- RAILWAY INSULATORS
- BIRD PROTECTION INSULATORS
- 110 KV COMPOSITE INSULATORS
- INSULATED CROSS ROD
- FUSE DEVICES
- INSULATORS IN CHAIN FOR 25 KV
- FALL STOPS

**FUSE DEVICES**



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TYPE	NOMINAL VOLTAGE KV	NOMINAL AMPERAGE A	DIMENSIONS/MM							
			a	b	c	d	e	f	g	h
KBSZ 24/E	24	100	300	605	50	365	442	600	100	458
KBSZ 24/TF	24	100	300	605	50	365	442	600	100	458
KBSZ 35/E	35	100	310	575	50	360	538	650	100	515
KBSZ 40,5/E	40,5	100	375	575	50	410	538	720	100	595

**Notes:**

„E” = 2 x epoxy insulator or 2 x composite

„TF” = 1 x epoxy insulator + 1 x overvoltage arrester or 1 x composite insulator + 1 x overvoltage arrester

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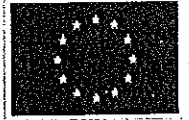
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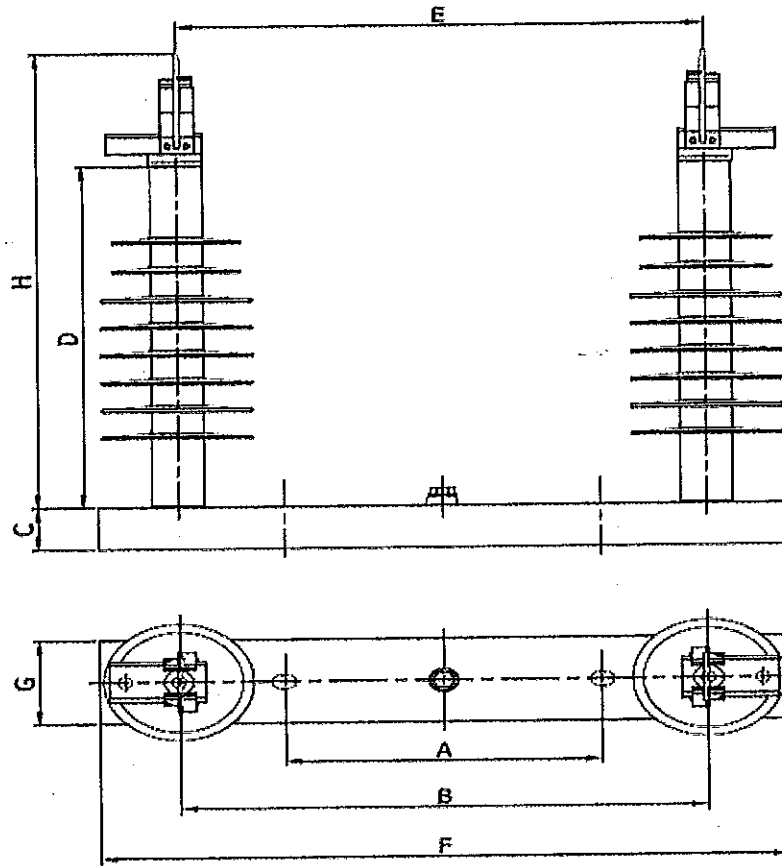
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**NYIR-MIX-TRADE**  
Ipari Szolgáltatás és Kereskedelmi Kft.



DRAWING



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**ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ**  
**от ДОСТАВЧИК** No: CONT/001/7015

Име на клиента: **Контрагент 35 ЕООД**  
Адрес на клиента: ул. "Индустиална"  
ПК: 177 6000 Стара Загора,  
БЪЛГАРИЯ  
Лице за контакт: г-н Пламен Петков  
Данни за контакт:

Име на производителя: **NYIR-MIX-TRADE KFT**  
Адрес на производителя: 4461 Nyirtelek, Bethlen G.  
Street 1/A  
Лице за контакт: Norbert Pasztor  
Данни за контакт: +36-30-6223-213  
Номер на серификата: **MS 0724-041 MSZ**  
**EN ISO 9001:2009**  
Валидан до 21 Юни, 2016.

Наименование на типа:

**KBSZ 12/E**  
**KBSZ 24/SZ**  
Основа за предпазител за открит/закрит  
монтаж, 1 фазни  
с 2 държача за предпазител  
Количество:

**Приложимост:** могат да бъдат използвани в  
открити/закрити системи за напрежения 12kV и 24kV  
В замърсени и силно замърсени райони като основа за  
предпазител за една фаза при изграждане на  
електрически мрежи.  
Основата KBSZ 12/E и материалите са съгласно  
"ЧЕЗ Техническа спецификация за 10kV основи за  
предпазител"  
Основата KBSZ 24/SZ и материалите са съгласно  
"ЧЕЗ Техническа спецификация за 20 kV основи за  
предпазител"

Сертифицираща организация: **VEIKI-VNL Villamos Nagylaboratoriumok KFT**  
Адрес: H-1 158 Budapest, Vaszolyo Street 2-4  
ID номер: **NAT-1-1251/2007**

Протоколи от изпитвания: 5650/VNL  
4478/VNL ZP  
88/2007  
VAL-702/21 ZP  
87/2007  
TMV-063/2003

Съответствие на стандарти-  
- EN 61952:2008  
- EN 62217: 2006  
- EN ISO 1461  
- EN 60273:2003

Чертежи Основи No.: **KBSZ 24/SZ NYMK 99/604**  
**KBSZ 12/E NYMK 99/603**

Име и длъжност на отговорното лице • Norbert Pasztor  
Ръководител Управление на качеството

Подготвил:  
10.12.2015

**NYIR-MIX-TRADE KFT**  
4461 Nyirtelek, Bethlen G. o. 1/A.



# SUPPLIER'S DECLARATION OF CONFORMITY

Number: **CONT/001/2015**

<p>Customer's name: <b>CONTRAGENT 35 LTD</b></p> <p>Customer's address: INDUSTRIALNA STR. P.O.B. 177 6000 STARA ZAGORA BULGARIA</p> <p>Name of contact person: Mr. Plamen Petkov Contact details:</p>	<p>Manufacturer's name: <b>NYIR-MIX-TRADE KFT</b> Manufacturer's address: 4461 Nyírtelek, Bethlen G. Street 1/A Name of contact person: Norbert Pásztor Contact details: +36-30-6223-213 Number of certificate: <b>MS 0724-041</b> <b>MSZ EN ISO 9001:2009</b> Valid until: <b>21<sup>st</sup> June, 2016.</b></p>
<p><u>Name of type:</u></p> <p><b>KBSZ 12/E KBSZ 24/SZ complete fuse base for outdoor/indoor usage 1 phase with 2 fuse link holder</b></p> <p><u>Quantity:</u></p>	<p><u>Applicability:</u> it can be used in outside/inside systems up to nominal voltage of 12 kV and 24 KV, in contaminated and strongly polluted areas as a fuse base for one phase when building electric mounting networks. The KBSZ 12/E fuse base and materials are according to the "CEZ technical specification for 10 KV fuse base" The KBSZ 24/SZ fuse base and materials are according to the "CEZ technical specification for 20 KV fuse base"</p>

Certifying organization: **VEIKI-VNL Villamos Nagylaboratóriumok KFT**  
Address: **H-1158 Budapest, Vasgolyó Street 2-4**  
ID number: **NAT-1-1251/2007**

Test reports:

5650/VNL  
4478/VNL  
ZP 88/2007  
VAL-702/21  
ZP 87/2007  
TMV-063/2003

Accordance to Standards:

- EN 61952:2008
- EN 62217: 2006
- EN ISO 1461
- EN 60273:2003

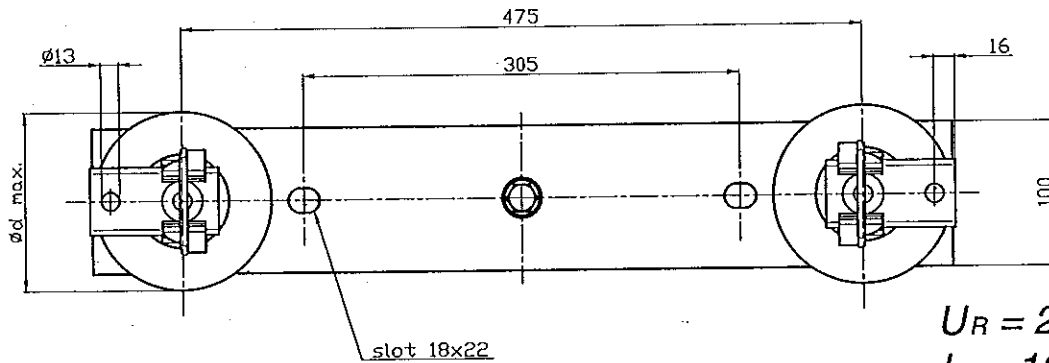
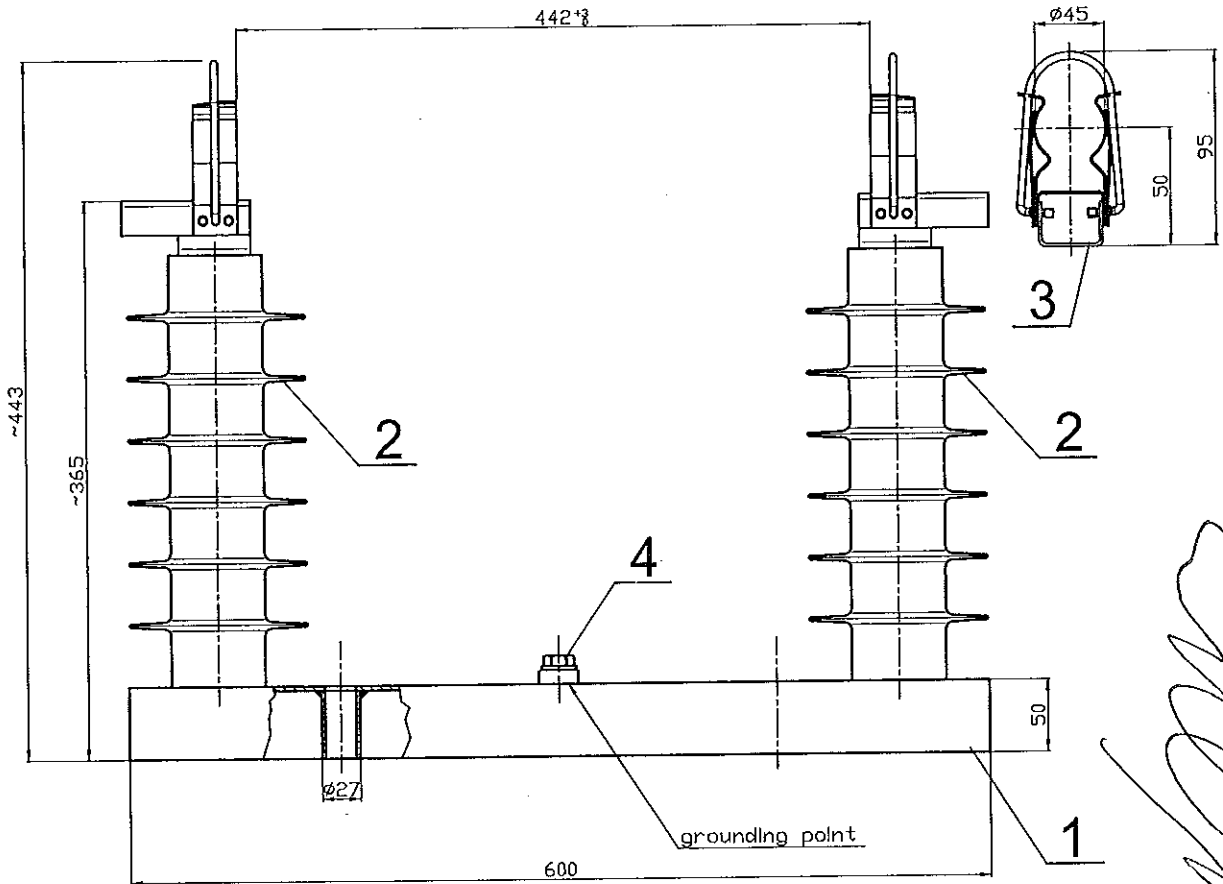
Fuse base drawing nos.: **KBSZ 24/SZ NYMK 99/604**  
**KBSZ 12/E NYMK 99/603**

Name and position of liable person: **Norbert Pásztor**  
Quality Management Leader

Prepared: 10.12.2015

**NYIR-MIX-TRADE KFT.**  
4461 Nyírtelek, Bethlen G. u. 1/A.

*Technical drawing No. 14.1.*



$U_R = 24kV$   
 $I_R = 100A$   
 Weight: 7.3kg

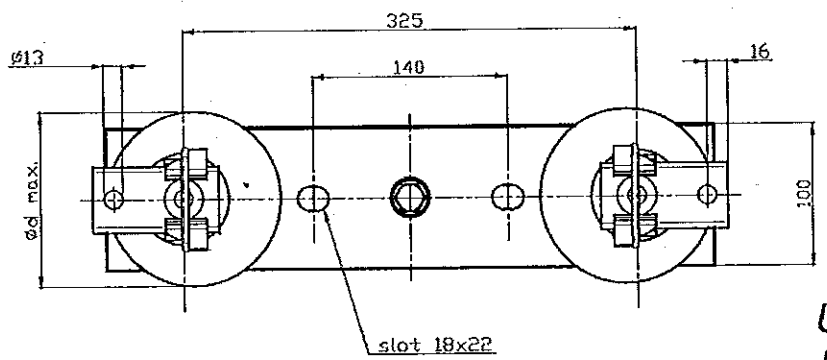
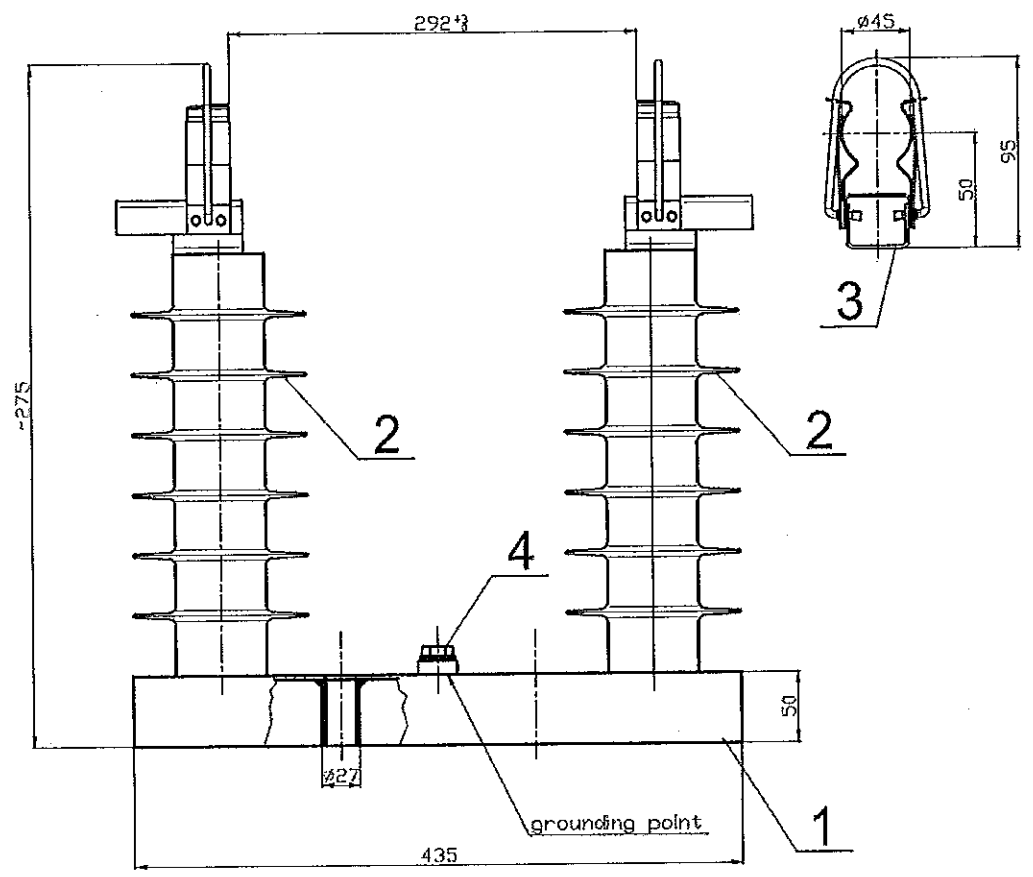
Ser.no.	Piece	Description	Dimension	Material	Note
4	1	Grounding screw	M12x35	KO	stainless steel
3	2	Fuse link holder	Ø45x95	copper	nickel plated (10-12 µm)
2	2	Composite insulator	SGT 24/1	HTV	silicone rubber
1	1	U beam (thck.=3mm)	100x50x600	S355 JR	hot-dip galvanized 85 µm

name:	signature:	designation:	scale:	company name:
designer:	András Pásztor	24 kV fuse base for indoor/outdoor usage	1:5	Nyír-Mix - Trade Kft.
drawer:	Péter Hulvej		date:	Nyíregyháza, Kossuth u.70
controller:	Norbert Pásztor	type:	04.12.2015.	drawing number:
		KBSZ 24 / SZ		Nymk-99/604
		material:		number of sheets: 1
				no.:

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*Техническое № 14.2.*



$U_R = 12kV$   
 $I_R = 100A$   
 Weight: 4.5kg

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4	1	Grounding screw	M12x35	KO	stainless steel
3	2	Fuse link holder	Ø45x95	copper	nickel plated (10-12 µm)
2	2	Epoxy Insulator	ETA-12	EPOXY	
1	1	U beam (thck.=3mm)	100x50x435	S355 JR	hot-dip galvanized 85 µm

Ser.no.	Piece	Description	Dimension	Material	Note
name:	signature:	designator:		scale:	company name:
designer:	András Pásztor	12 kV fuse base for indoor usage		1:5	Nyír-Mix -Trade Kft. Nyíregyháza, Kossuth u.70
drawer:	Péter Hulvej	type:		date:	drawing number:
controller:	Norbert Pásztor	KBSZ 12 / E		04.12.2015.	Nymk-99/603
		material:		number of sheets:	no.:
				1	

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*Handwritten signature and number 2/25*

Търговско съобщение № 15



6000 Стара Загора; ул. Индустриална, ПК 177; тел. (042) 25-51-73 факс: (042) 600-129, e-mail: [office@contragent.com](mailto:office@contragent.com)  
1233 София; ж.к. Банищора, ул. Опълченска, бл.42А, вх. Ж, пом. 1, тел. (02) 931-0473, факс: (02) 931-4184, [sofia@contragent.com](mailto:sofia@contragent.com)  
4000 Пловдив; бул. Коматевско шосе 26, , тел. (032) 67-37-31, факс: (032) 67-37-32, [plovdiv@contragent.com](mailto:plovdiv@contragent.com)  
9000 Варна; ПК 150; тел. (052) 599 631, факс: (052) 599 632, [varna@contragent.com](mailto:varna@contragent.com)  
Web site: [www.contragent.com](http://www.contragent.com)

**СПИСЪК С ИЗПИТВАНИЯТА**  
на основи за предпазители средно напрежение

1. Изпитване на електрическа устойчивост
  - Изпитване с импулсно напрежение
  - Изпитване с напрежение с индустриална честота в сухо и мокро състояние
2. Изпитване с нагряване
3. Устойчивост на късо съединение

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**VEIKI-VNL VILLAMOS NAGYLABORATÓRIUMOK KFT.  
VEIKI-VNL ELECTRIC LARGE LABORATORIES LTD.**

**VNL-VEIKI**

**Test report**

**No. 4478 / VNL**

**Electric strength type test of KBSZ 24/E fuse carrier**

**29<sup>th</sup> of May 2006**

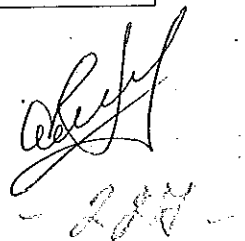


NAT	MSZ EN ISO 9001		
TESTER	MSZT	IQNET	STL
NAT-1-1251/2004	CERT	MSZT-503/0243-077	PARTICIPANT
	503/0243		

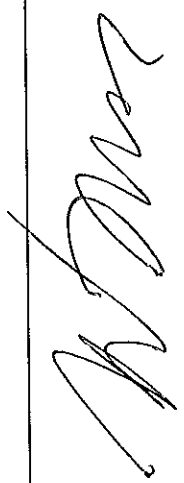
VEIKI-VNL Ltd.'s accreditation related to the test activities registered under the no. NAT-1-1251/2004.

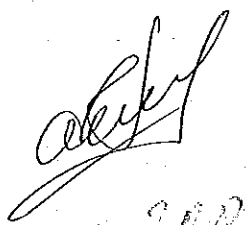
H-1158 Budapest, Vaszolyó u. 2-4.  
E-mail: [vnl@vnl.hu](mailto:vnl@vnl.hu)

Tel: 417-3157, 417-3158 Fax: 417-3163  
[www.vnl.hu](http://www.vnl.hu)



VNL VEIKI	VEIKI-VNL ELECTRIC LARGE LABORATORIES LTD.	test report No. 4478 / VNL Page 2/7
<i>Description of the test:</i>	Electric strength type test of KBSZ 24/E fuse carrier	
<i>Nature of the test:</i>	Type test	
<i>Client:</i>	NYIR-MIX-TRADE Ltd 4400 Nyíregyháza, Kossuth u. 70.	
<i>Number and date of order:</i>	91/2006. 21.03.2006.	
<i>Project number of the commission work:</i>	V-210/2006	
<i>Place and date of the test:</i>	VEIKI-VNL Villamos Nagylaboratóriumok Kft. 1158 Budapest XV. Vasgolyó u.2. 27 <sup>th</sup> of March 2006	
<i>Client's representative present:</i>	-	



4478

VNL  
VEIKI

VEIKI-VNL ELECTRIC LARGE LABORATORIES  
LTD.

test report  
No. 4478 / VNL  
Page 3/7

*Data of the test piece:*

Description: High-voltage fuse carrier  
Manufacturer: NYIR-MIX-TRADE Ltd.  
Type: KBSZ 24/E  
Serial number: 2006/2002  
Un = 24 kV

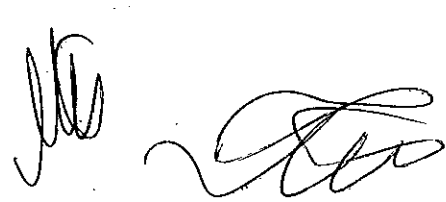


*Documentation identifying the test piece:*

Description:	Drawing no.:
Fuse carrier	B 24 - 01/1
20-kV artificial resin device insulator	K 24 - 10/1
Cartridge holder	B 24 - 03/1

*Standards taken into account for the test:*

IEC 60282-1:2005 Part 1: Current-limiting fuses  
IEC 60060-1:1989 High-voltage test techniques. Part 1: General definitions and test requirements.



*Summary of the test results:*

We performed the electric strength type test of the fuse carrier of KBSZ 24/E type in one-phase connection method in accordance with the provisions of the referred standards.

Electric strength tests on the fuse carrier of KBSZ 24/E type:

- Impulse voltage test
- Dry and sprinkled test of industrial frequency in the vertical and horizontal position of the fuse carrier

Neither arc-over nor breakdown occurred during the test, so the fuse carrier of KBSZ 24/E type meets the electric strength requirements of the referred standard.

1. All rights reserved. VEIKI-VNL Ltd.
2. This test report is a confidential document, which is forbidden to be handed over to a third person without the written permission of the Client.
3. The results indicated in this report relate only to the tested device, equipment.
4. During the tests the uncertainties of measurement may not exceed the values specified by the standards referred to on Page 3.
5. This report may only be published or reproduced in its full, without any change, in the original language. For any publication different from it, the written permission of VEIKI VNL Ltd. will be necessary.

Budapest, 29.05.2006.

.....  
/Csaba Homokl/  
test performed by

.....  
/Ildikó Fogarasi/  
controlled by

.....  
/Dr. László Varga/  
managing director

Numbered sheet:	7	Table:	-	Oscillogram:	2
Figure:	-	Photo:	1	Drawing:	3



**1. Description of the tests**

**1.1 Impulse test**

In accordance with the provisions of the referred standard, we tested the fuse carrier of KBSZ 24/E type in the following connection methods and under the following voltages.

a) Between the terminals and the earthed metal sections;  $U_{pl} = 125 \text{ kV}_{cs}$

1) On fuse finish-assembled for regular use and including the fuse cartridge and fuse head (Photo 1).

2) On fuse without fuse cartridge

b) Between the terminals;  $U_{pl} = 145 \text{ kV}_{cs}$

The test voltages were corrected in accordance with the atmospheric parameters existing during the test in the way defined in the standard no. IEC 60060-1.

- Atmospheric parameters:  $T_{dry} = 17.6^{\circ}\text{C}$   
 $T_{wet} = 12.8^{\circ}\text{C}$   
 $P = 1001 \text{ hPa}$
- Atmospheric correction factor:  $K = 0,9727$

The tested fuse carrier must endure 15 impulses of 1.2/50  $\mu\text{s}$  wave form for each connection method and polarity without breakdown and with two cases of arc-over for each test series.

Characteristics of the impulse applied during the test:

- duration of wave-front: 1.14 – 1.16  $\mu\text{s}$
- half-value period: 50.7 – 51.1  $\mu\text{s}$
- amplitude: 121.8 – 122.3 kV / 140.4 – 140.7 kV

**1.2 Voltage test of industrial frequency in dry and sprinkled condition**

In accordance with the provisions of the referred standard, we tested the fuse carrier of KBSZ 24/E type in the following connection methods and under the following voltages.

a) Between the terminals and the earthed metal sections;  $U_{pl} = 50 \text{ kV}_{eff}$

1) On fuse finish-assembled for regular use and including the fuse cartridge and fuse head

2) On fuse without fuse cartridge

b) Between the terminals;  $U_{pl} = 60 \text{ kV}_{eff}$

The test voltages were corrected in accordance with the atmospheric parameters existing during the test in the way defined in the standard no. IEC 60060-1.

- Atmospheric parameters:  $T_{dry} = 17.6^{\circ}\text{C}$   
 $T_{wet} = 12.8^{\circ}\text{C}$   
 $P = 1001 \text{ hPa}$
- Atmospheric correction factor: dry: 0.9963  
sprinkled: 0.9680

The test voltage will be applied to the test piece in each test method for 1 minute in both dry and sprinkled condition in the vertical and horizontal position of the fuse carrier.

If during the test neither breakdown nor arc-over takes place, and during the test repeated after arc-over in sprinkled condition neither breakdown nor arc-over takes place, then the fuse carrier will meet the requirements.

The characteristics of the artificial rain applied for the sprinkled test:

- Vertical component of the strength of the rain: 1.6 mm/min
- Horizontal component of the strength of the rain: 1.6 mm/min
- Specific resistance of the rainwater: 10000  $\Omega\text{cm}$
- Direction of the rain onto the axis of the insulator: 45°

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VNL VEIKI	VEIKI-VNL ELECTRIC LARGE LABORATORIES LTD.	test report No. 4478 / VNL Page 6/7
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## 2. Results of the test

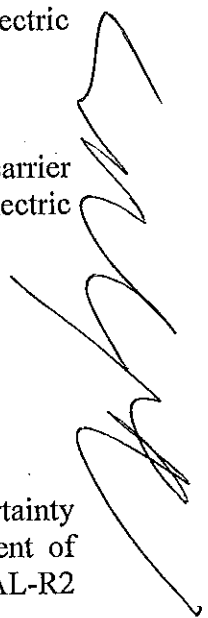
### 2.1 Impulse voltage test

During the test described in Point 1.1, neither breakdown nor arc-over took place on the fuse carrier of KBSZ 24/E type, therefore it meets the requirements of impulse voltage test of the electric strength test of the referred standard.

The report includes one impulse voltage applied for each test.

### 2.2 Voltage test of industrial frequency in dry and sprinkled condition

During the test described in Point 1.2, neither breakdown nor arc-over took place on the fuse carrier of KBSZ 24/E type, therefore it meets the requirements of industrial-frequency test of the electric strength test of the referred standard.

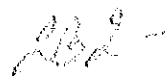
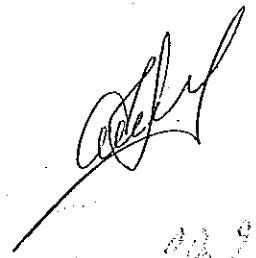


## 3. Uncertainty of measurement

The uncertainty of measurement of the impulse voltage test:  $\pm 0.5\%$ .

The uncertainty of measurement of the industrial-frequency test:  $\pm 1\%$ .

The announced extended uncertainty of measurement is the value of the standard uncertainty multiplied with  $k=2$ , which equals approximately 95% probability of covering in the event of normal distribution. The standard uncertainty was determined in accordance with the EAL-R2 publication.



VNL VEIKI	VEIKI-VNL ELECTRIC LARGE LABORATORIES LTD.	test report No. 4478 / VNL Page 7/7
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*Equipment and instruments applied for the tests:*

Item no.	Description	Manufacturer	Type	Serial no.	Number of calibration document
1	Transformer	TUR	WPT 4.4/100	887717	FR-03/2004
2	Built-in display instrument (kV)	EMR	75/12	84	
3	Built-in display instrument (mA)	EMR	75/10	78	
4	Impulse generator	MICAFIL	SH 11-24	B1698	
5	Voltage distributor – disk-type	VEIKI	TA-1	01	FO-06-LO/2005
6	Digital voltage measuring system	Dr. Strauss	TR-AS 100-10	350	196 DKD-K-11701 /00-08

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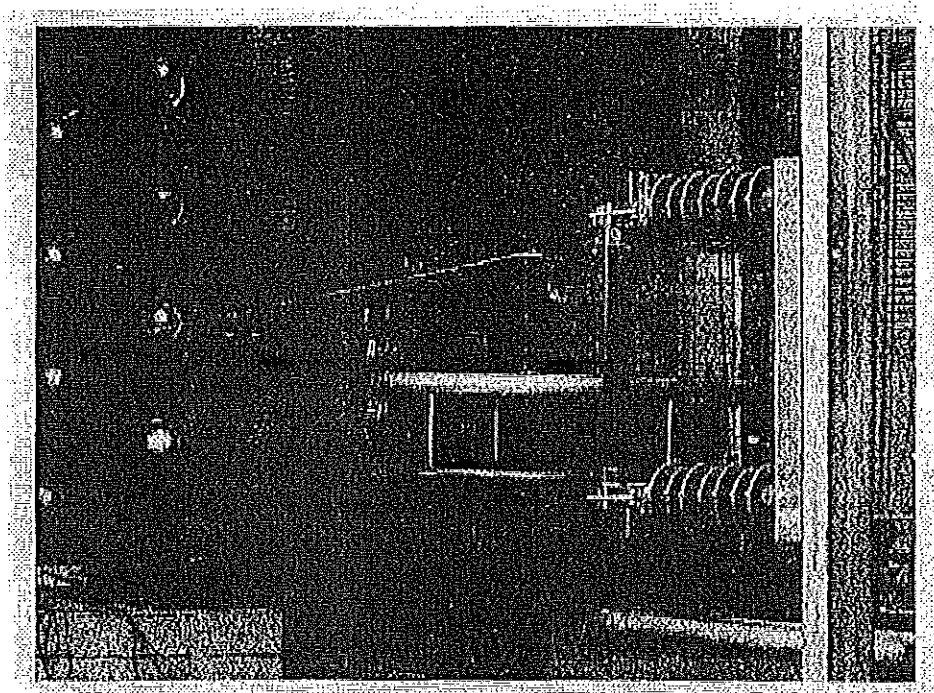
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VNL VEIKI	<b>VEIKI-VNL ELECTRIC LARGE LABORATORIES LTD.</b>	test report No. 4478 / VNL
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Photo no. 1  
Connection method for the electric strength tests

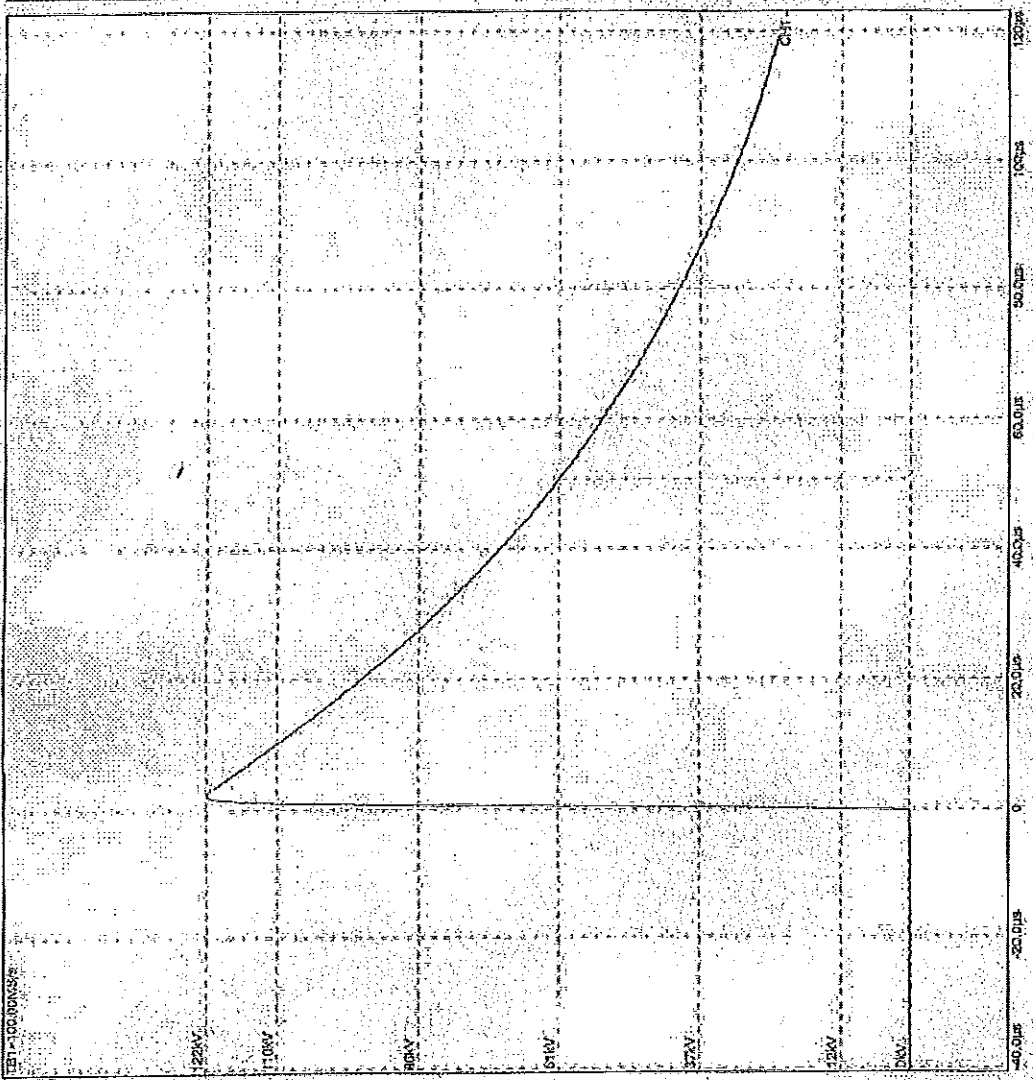
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No.: 6135  
 CH1  
 Eval: UJ  
 Up= 122.8kV  
 T1= 1.14µs  
 T2= 50.9µs



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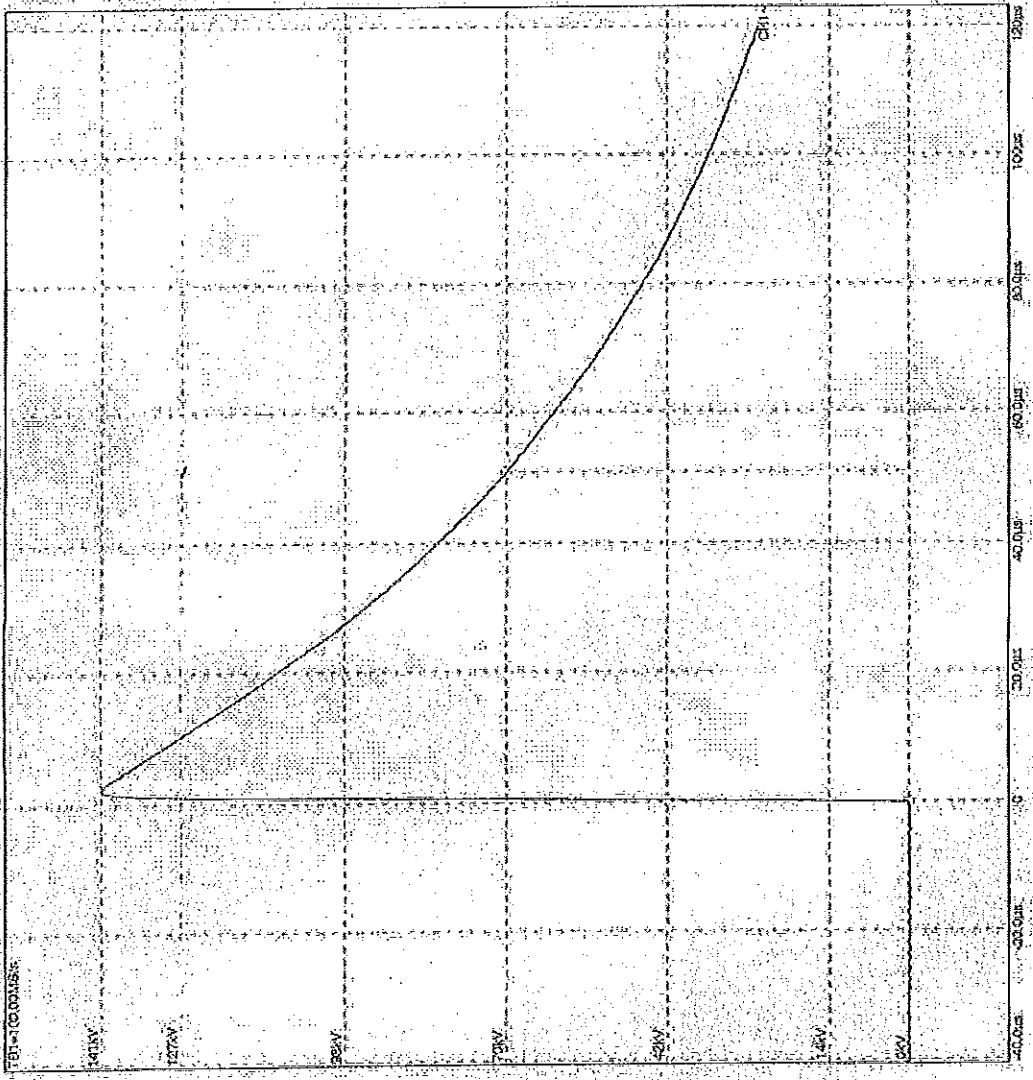
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No: 8182

CH1  
Eval: LI  
Up: 140.7mV  
T1: 1.150s  
T2: 51.1µs



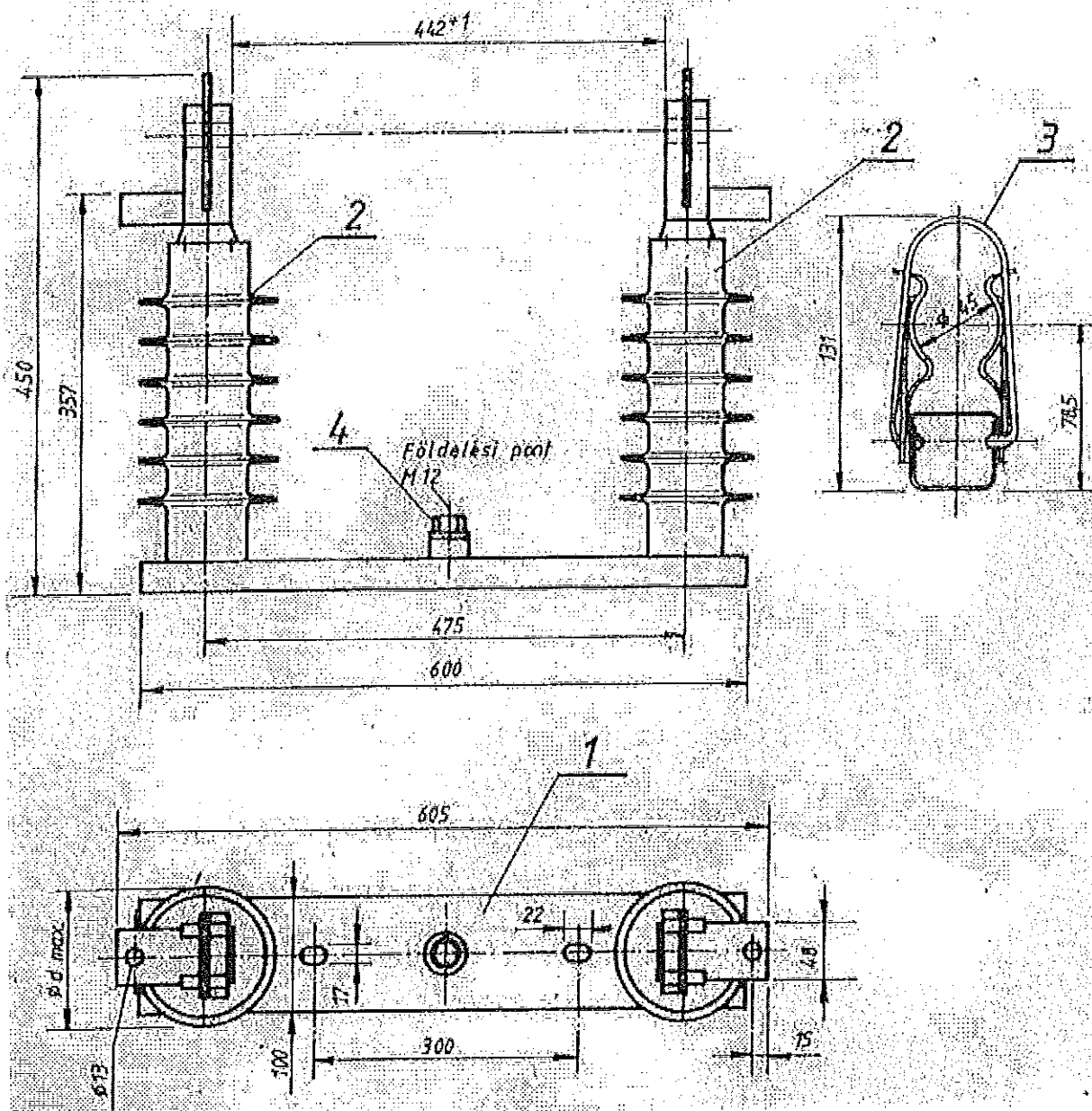
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250



Manufacturer		Nyír-Mix-Trade Ltd			
Date		31.03.2006			
4	1	Earthing screw	M 12x35	KO	
3	2	Cartridge holder	Ø45x131	KO	
2	2	Poxi insulator	KT2-125	Epoxi	X 100
1	1	U bottom plate	Th3x600x1000	A 60	Dip galvanized
Item	Pc.	Description	Size	Material	Remark
Designer:		Description:			Scale:
Drawn by:		<b>Fuse carrier</b>			Sheet size: A/4
Checked by:		Type:	Drg. No.:		Material:
		KBSZ 24/E	B 24 - 01/1		

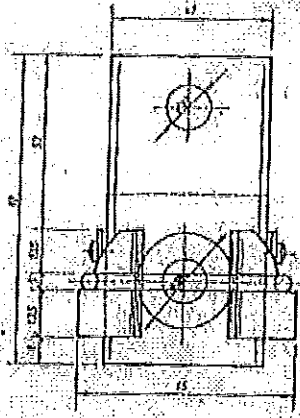
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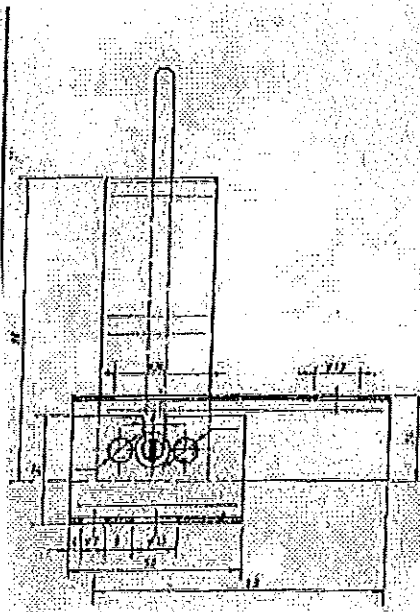




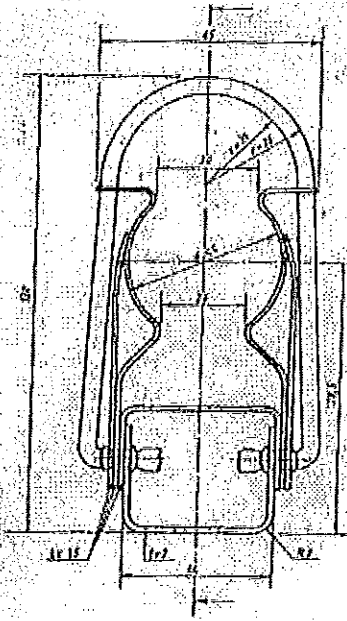
TOP VIEW M = 1:2



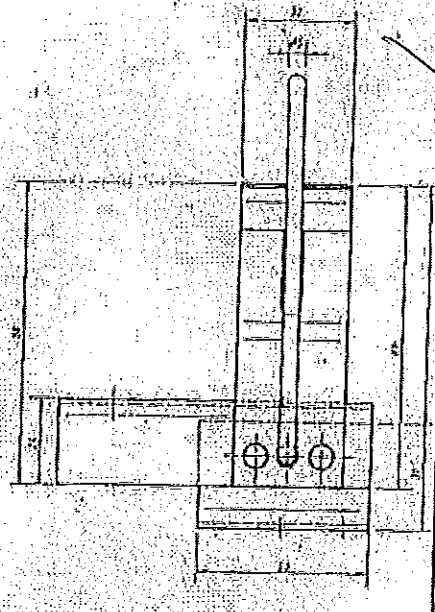
SECTIONAL DRAWING



FRONT VIEW M = 1:2

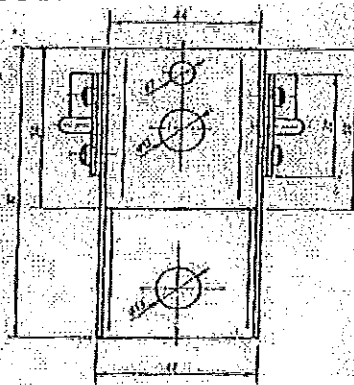


SIDE VIEW M = 1:2



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BOTTOM VIEW M = 1:2



Manufacturer	Nyir-Mix-Trade Ltd			Scale: M 1:2
Date	31.03.2006			Sheet size: A/4
Designer:		Description:		Material: KO
Drawn by:		<b>Cartridge holder</b>		
Checked by:		Type:	Drg. No.:	
		<b>KBSZ 24/TF</b>	<b>B 24 - 03/1</b>	

*Handwritten signatures*

INFOWARE ZRt.  
SHORT-CIRCUIT TEST STATION  
2310 SZIGETSZENTMIKLÓS, HATÁR U.22.

TEL: (06)24-465-171  
FAX: (06) 24-442-139  
E-MAIL: mihalkovcis@infoware.hu

NO. ACCREDITATION DOCUMENT:  
NAT - 1 - 1414/2005

Test Report

Report no.:  
ZP 87 / 2007

Page no.:  
1/10

SUBJECT OF THE TEST: <b>HEATING TEST OF 24-kV FUSE CARRIER</b>		
CLIENT NAME AND ADDRESS: NYÍR-MIX-TRADE LTD 4400 NYÍREGYHÁZA, KOSSUTH U. 70.		NATURE OF THE TEST: Type test
LOCATION OF TEST: INFOWARE ZRt. Short-circuit test station Szigetszentmiklós, Határ u. 22.	DATE: 22.11.2007.	
PERSONS PRESENT AT THE TEST:	REPORT SENT/DELIVERED: András Pásztor, NYÍR-MIX-TRADE LTD	
DATE OF ISSUE OF THE ORIGINAL REPORT: 22.11.2007.	DATE OF ISSUE OF THE COPY EQUAL TO THE ORIGINAL:	L.S.
TEST PERFORMED BY:  Testing Engineer, Gábor Somogyi	CHECKED AND APPROVED BY:  Leader of the Lab, Dr. Tibor Mihákovics	

<b>DATA OF THE TEST PIECE:</b>	
MANUFACTURER/TYPE/SERIAL NUMBER:	NYÍR-MIX-TRADE LTD/KBSZ 24/E/2006 - 0002
NOMINAL VOLTAGE:	24 kV
NOMINAL CURRENT:	63 A
NOMINAL DYNAMIC LIMIT CURRENT:	15kA

<b>DATA OF THE FUSE CARTRIDGE USED FOR THE TEST:</b>	
MANUFACTURER/TYPE:	EFEN / NNGk 67740.0630
NOMINAL VOLTAGE:	24kV
RATED CURRENT:	63A
LOSS (MEASURED VALUE):	162W
I <sub>1</sub> :	31.5kA
I <sub>3</sub> :	250A

INFOWARE work number: IWS 070119

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240 -

The results indicated in the report relate only to the tested device, equipment.

1. SUMMARY OF THE TEST RESULTS

The KBSZ 24/E-type fuse carrier of 24kV nominal voltage and 63A rated current equipped with EFEN NNGk 24kV/63A fuse cartridge of 162W loss when heated to operating temperature met the requirements of the heating test performed in accordance with Point 6.5 of MSZ EN 60282-1 (IEC 60282-1):

the highest warming-up measured on the upper spring contact was 60K<65K.

Drawings supplied for the identification of the test piece:

Fuse carrier	B 24 - 01/1
20 kV artificial resin insulator	K 24 - 10/1
Cartridge holder	B 24 - 03/1

NUMBERED PAGE: 10	OSCILLOGRAM: -	PHOTO: 3
PICTURE: -	CHART: 2	DRAWING: 3

Standards applied for the test: MSZ EN 60282-1:2006: High-voltage fuses. Part no. 1. Current-limiting fuses
--

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241

**2. TESTING SCHEDULE, REGULATIONS AND THE METHOD APPLIED**

The heating test was done with EFEN NNGk 24kV/63A fuse cartridge placed in KBSZ 24/E fuse carrier in accordance with Point 6.5 of MSZ EN 60282-1 (IEC 60282-1).

**3. DESCRIPTION OF TESTS**

The heating test was performed in a closed room free of air flow, with the test piece being in vertical position. The test piece was connected with blank Cu rail of 12x5 mm<sup>2</sup> cross section and 1 m long each, on the bottom and top. The circuit arrangement and the THERM 5500 measuring data collector are shown in Photo no. 1.

The resistance of the cartridge measured prior to the test at 10°C:  $R_{cold} = 23.70$  mohm.

The ambient temperature was measured in 1 m distance from the test piece with three heat elements immersed in oil placed in its medium height. The place of insertion of the Ni-CrNi heat elements is shown in Table no. 1 and Photos no. 2 and 3. The stabilized temperatures, heating values measured with the THERM 5500 measuring data collector in the event of 63A load current and the permitted heating values according to Table 6 of MSZ EN 60282-1 are summarized in Table 1.

The measured values are rounded to 0.5°C.

The loss of the fuse cartridge measured in warm condition was  $P_{63\ warm} = 162W$ , out of this the calculated warm resistance:  $R_{warm} = 162W / (63A)^2 = 40.81$  mohm.

Place of insertion of heat element	Mark of heat element	Measured temperature (°C)	Measured heating (K)	Permitted heating (K)
Upper Cu rail at the connection to the fuse carrier	2	40.5	23.5	50
Top of the upper insulator next to the cartridge carrier	3	47.5	30.5	-
Left side of the upper spring contact	4	76.5	59.5	65
Right side of the upper spring contact	5	77.0	60.0	65
Left side of the lower spring contact	6	43.0	26.0	65
Right side of the lower spring contact	7	43.0	26.0	65
Lower Cu rail at the connection to the fuse carrier	8	27.0	10.0	50
Centre of the porcelain body of the fuse cartridge	0	135	118.0	-
Ambient temperature 1	TK1	17.5	-	-
Ambient temperature 2	TK2	16.5	-	-
Ambient temperature 3	TK3	17	-	-
Average of ambient temperatures		17	-	-

**Evaluation of the test:**

The KBSZ 24/E-type fuse carrier of 24kV nominal voltage and 63A rated current equipped with EFEN NNGk 24kV/63A fuse cartridge of 162W loss when heated to operating temperature met the requirements of the heating test performed in accordance with Point 6.5 of MSZ EN 60282-1 (IEC 60282-1) SINCE the highest warming-up measured on the upper spring contact was 60K < 65K.

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24/07

4. EQUIPMENT, MEASURING DEVICES USED DURING THE TEST

Table 2: Measuring devices used for the test

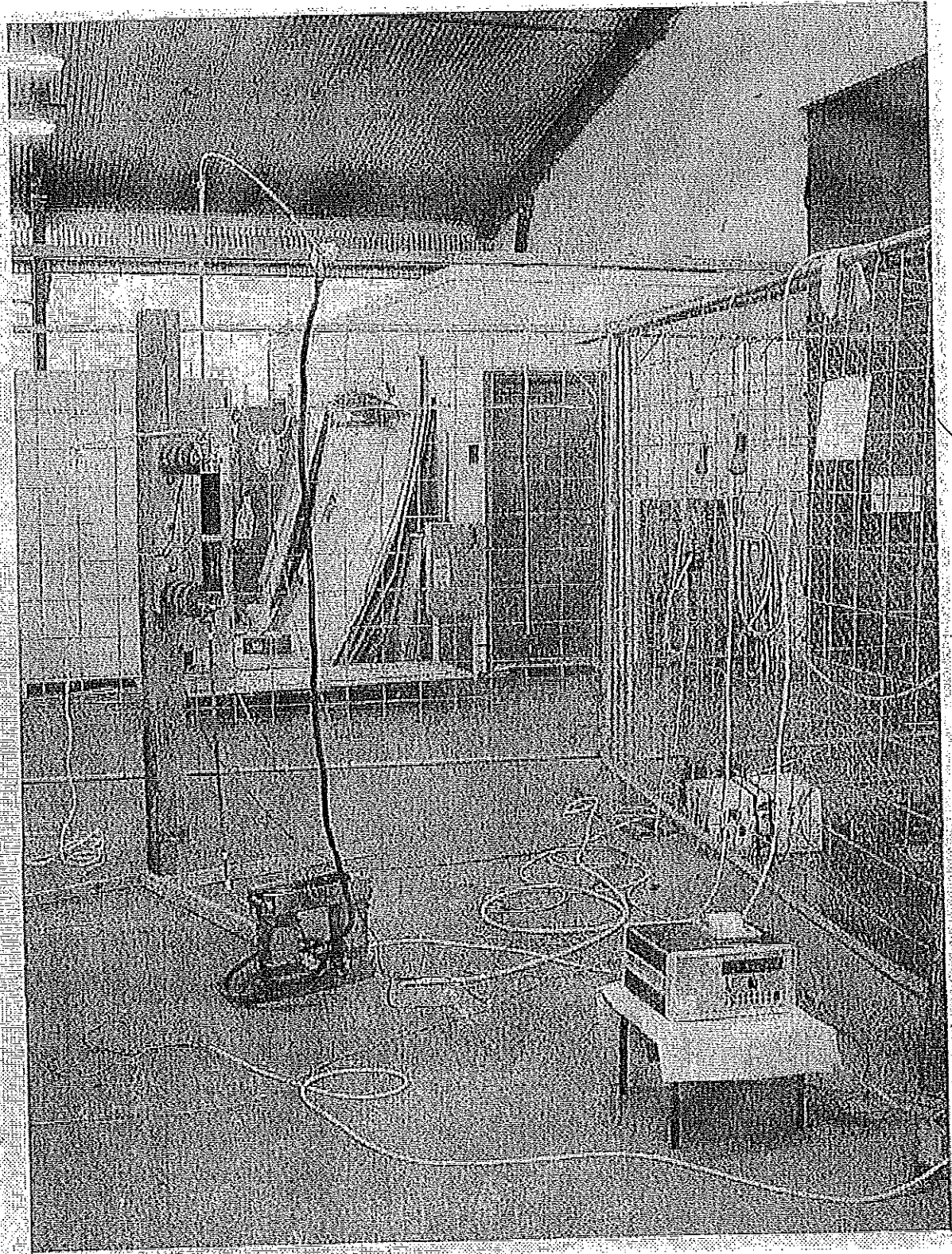
DESCRIPTION	MANUFACTURER/TYPE	SERIAL NUMBER	NUMBER OF THE CALIBRATION/CONTROL DOCUMENT
TRANSIENT RECORDER	HS / ITR-7068	001	MKJ07L10
MEASURING DATA COLLECTOR	AHLBORN / THERM 5500	A2719105	MKJ05 L076
CIRCUIT CHANGER	GANZ/MAK 62/30	894398	MKJ05L035
MULTIMETER	HP / 34401A	US36032819/97	0116/2007
MULTIMETER	HP / 34401A	3146A32584	0115/2007

The result of the measurements made with the equipment and/or measuring tools in accordance with the calibration or control documents can be traced back to the national etalon.

- Error of current measurement:  $\leq \pm 0.5\%$
- Error of temperature measurement:  $\leq \pm 1^\circ\text{C}$
- Error of resistance measurement:  $\leq \pm 1\%$
- Error of performance measurement:  $\leq \pm 1\%$

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Photo no. 1: Circuit configuration, location of test piece, THERM 5500 measuring data collector

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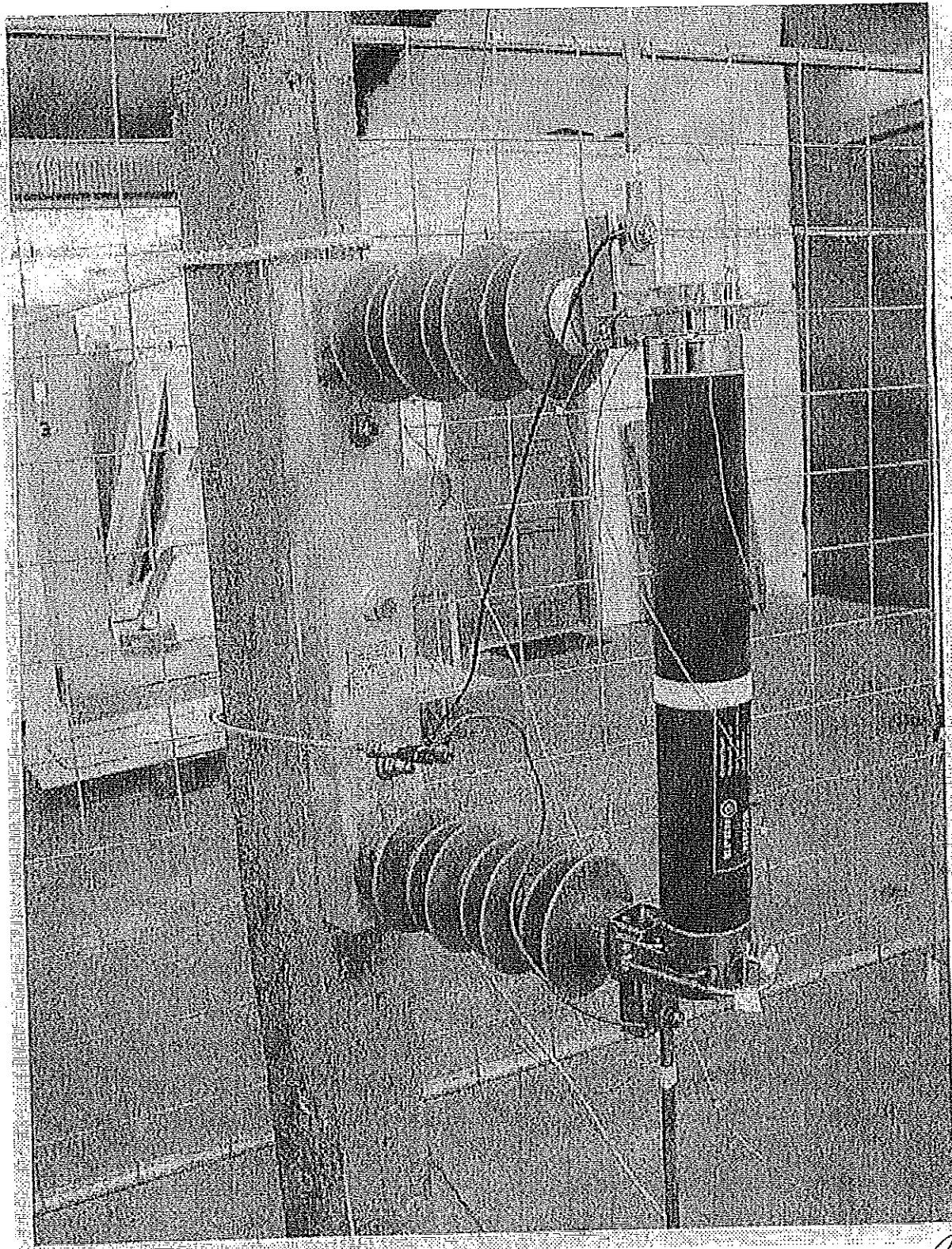
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Photo no. 2: Location of test piece and the heat elements

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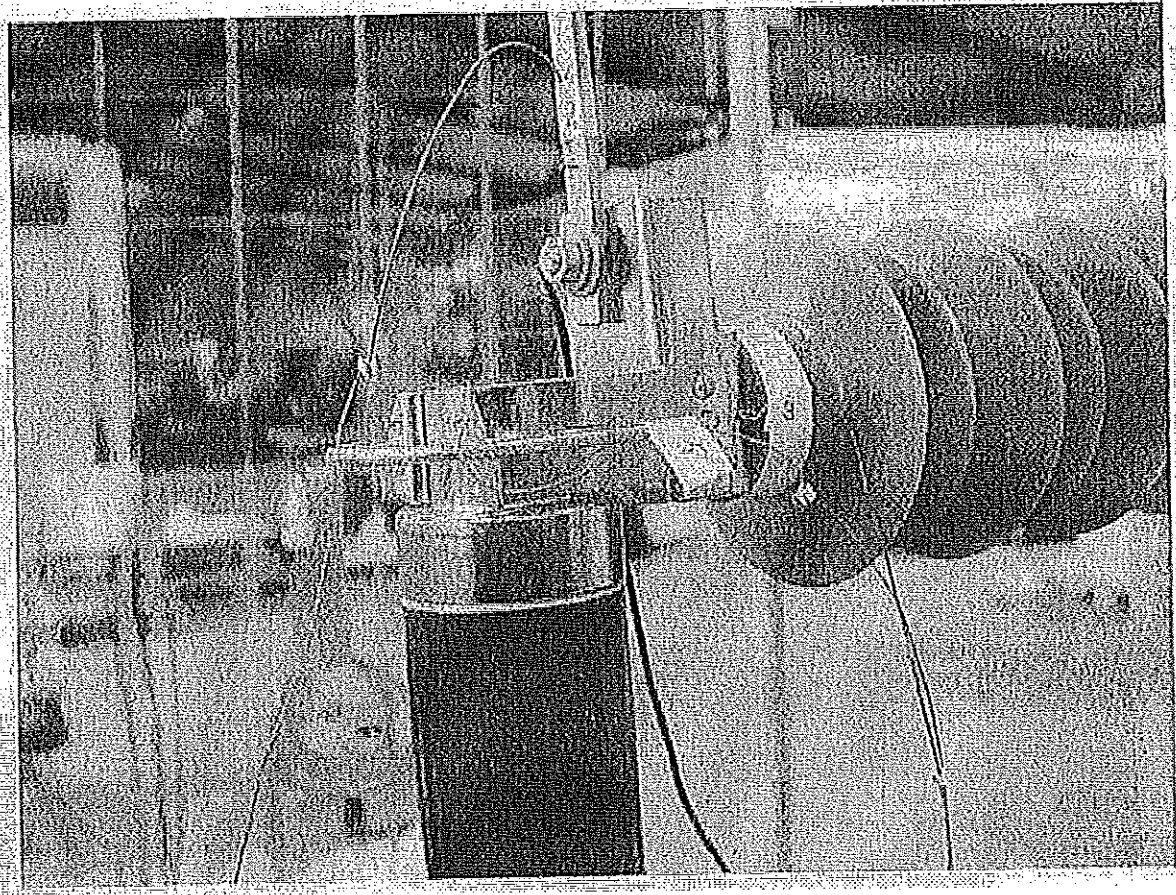


Photo no. 3: Heat elements marked 2, 3, 4 and 5

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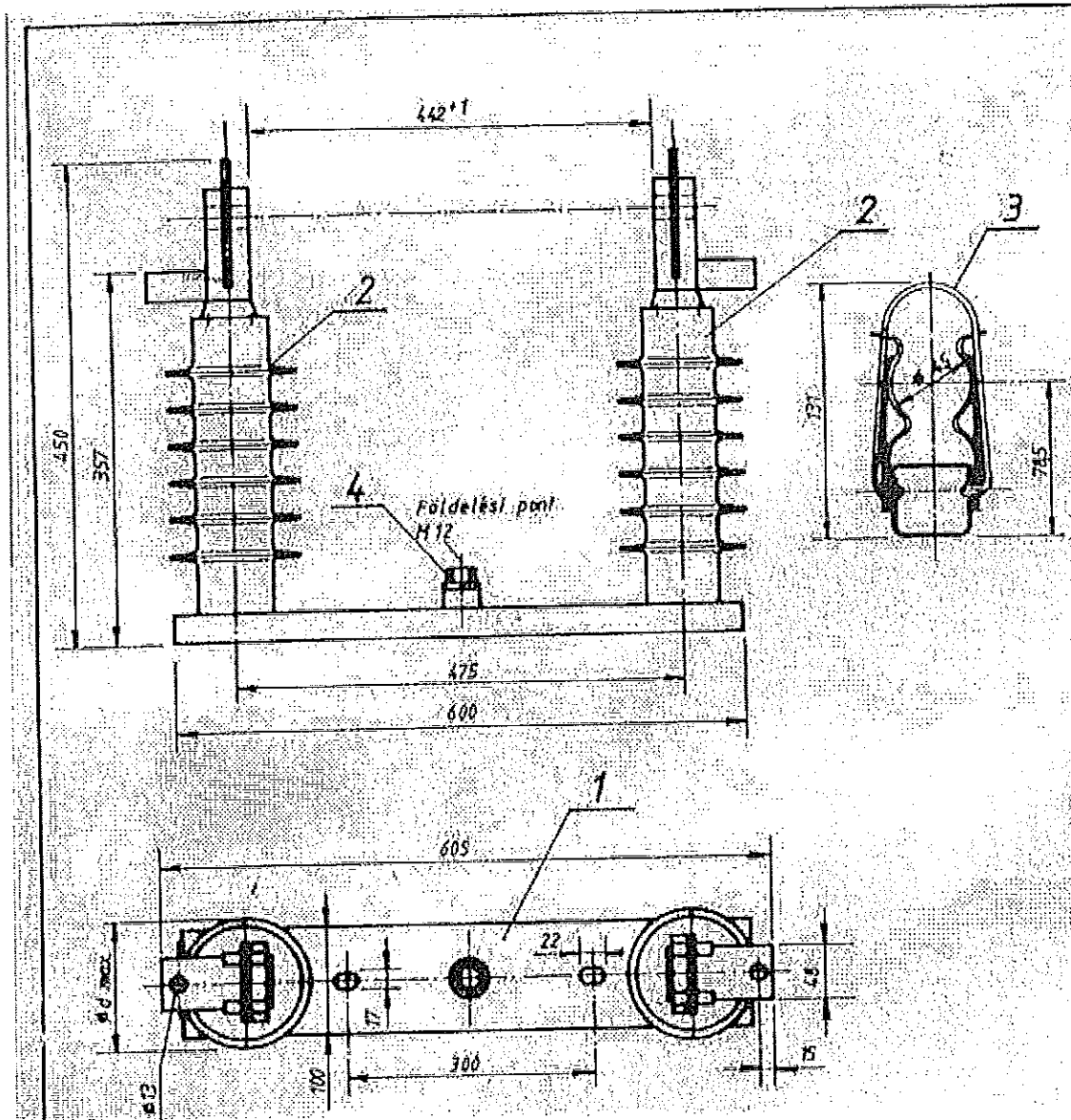
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Earthing point



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Manufacturer		Nyír-Mix-Trade Ltd			
Date		31.03.2006			
4	1	Earthing screw	M 12x35	KO	
3	2	Cartridge holder	Ø45x131	KO	
2	2	Poxi insulator	KT2-125	Epoxi	X 100
1	1	U bottom plate	Th3x600x1000	A 60	Dip galvanized
Item	Pc.	Description	Size	Material	Remark
Designer:		Description:			Scale:
Drawn by:		<b>Fuse carrier</b>			Sheet size: A/4
Checked by:		Type:	Drg. No.:		Material:
		KBSZ 24/E	B 24 - 01/1		

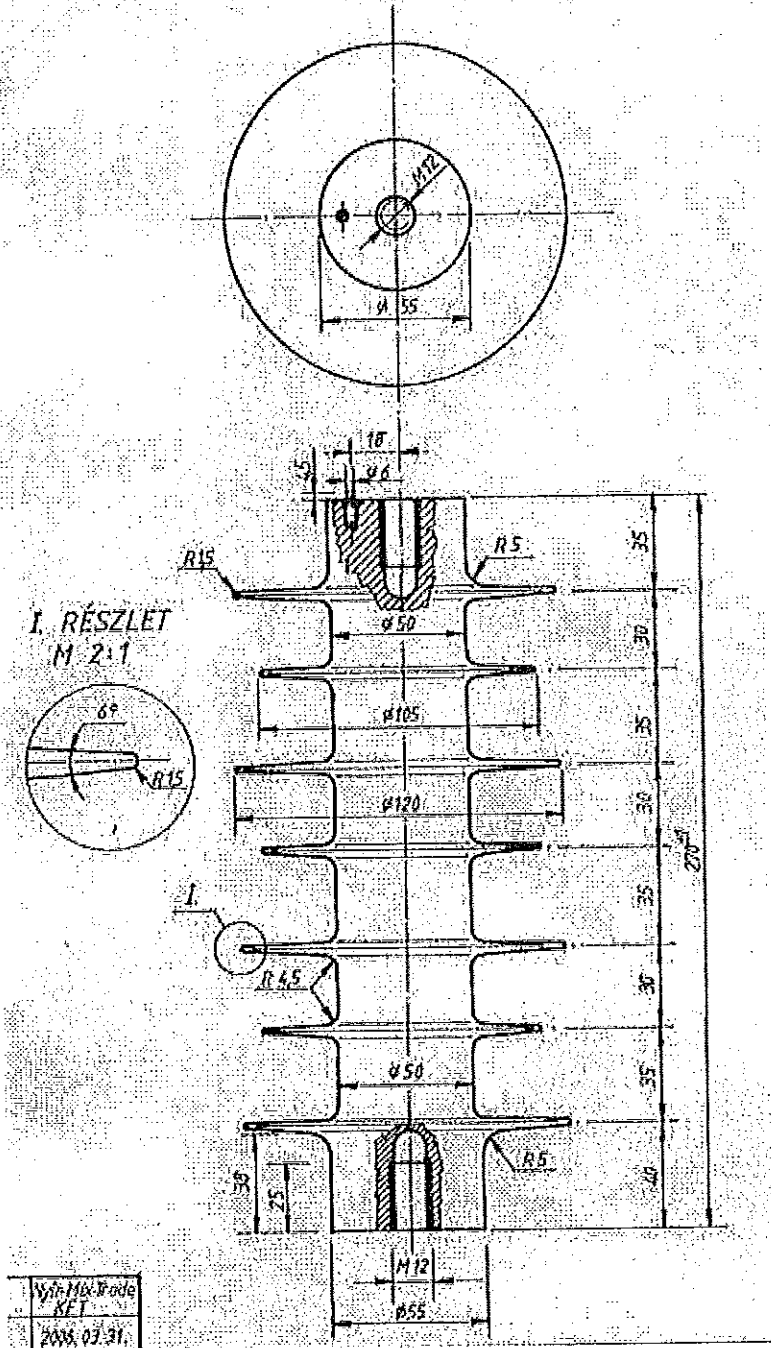
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DETAIL NO. 1  
M 2:1



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Nyr-Mix-Trade KFT
2006.03.31.

Manufacturer	Nyr-Mix-Trade Ltd		Scale: M 1:2
Date	31.03.2006		
Designer:	Description: <b>20 kV artificial resin device insulator</b>		Sheet size: A/4
Drawn by:			Material: Epoxy resin X100
Checked by:	Type: KT2-125	Drg. No.: K 24 - 10/1	


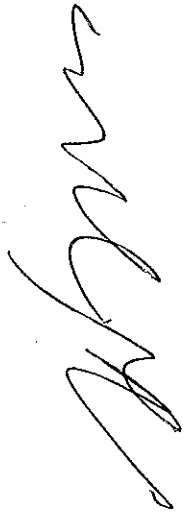
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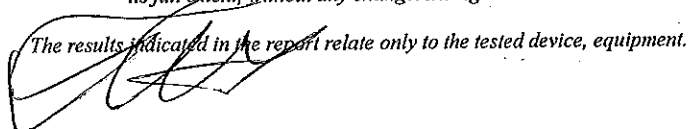
The results indicated in the report relate only to the tested device, equipment.

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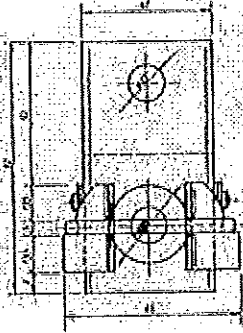


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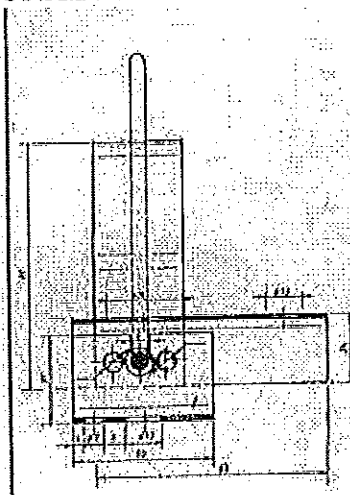


*The results indicated in the report relate only to the tested device, equipment.*

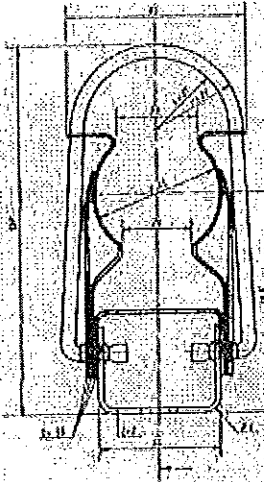
TOP VIEW M = 1:2



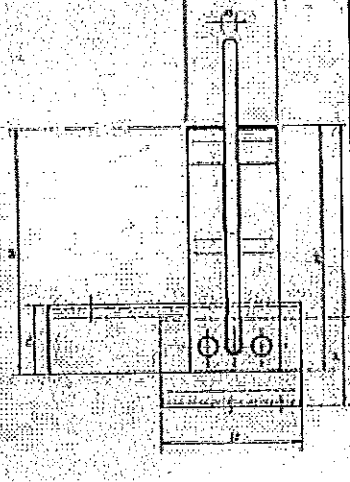
SECTIONAL DRAWING



FRONT VIEW M = 1:2

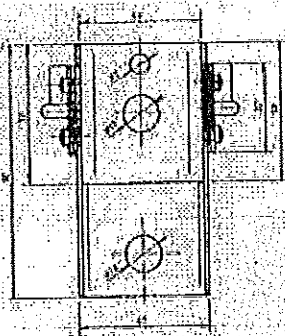


SIDE VIEW M = 1:2



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BOTTOM VIEW M = 1:2



Manufacturer	Nyir-Mix-Trade Ltd			Scale: M 1:2
Date	31.03.2006			
Designer:		Description:		Material: KO
Drawn by:		<b>Cartridge holder</b>		
Checked by:		Type:	Drg. No.:	
		<b>KBSZ 24/TF</b>	<b>B 24 - 03/1</b>	

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INFOWARE ZRt.  
SHORT-CIRCUIT TEST STATION  
2310 SZIGETSZENTMIKLÓS, HATÁR U.22.

TEL: (06)24-465-171  
FAX: (06) 24-442-139  
E-MAIL: mihalkovcis@infoware.hu

NO. ACCREDITATION DOCUMENT:  
NAT – 1 – 1414/2005

**Test Report**

Report no.:  
ZP 88 / 2007

Page no.:  
1/11

SUBJECT OF THE TEST: <b>SHORT-CIRCUIT PROOFNESS OF 24-kV FUSE CARRIER</b>		
CLIENT NAME AND ADDRESS: NYÍR-MIX-TRADE LTD 4400 NYÍREGYHÁZA, KOSSUTH U. 70.		NATURE OF THE TEST: Type test
LOCATION OF TEST:	INFOWARE ZRt. Short-circuit test station Szigetszentmiklós, Határ u. 22.	DATE: 22.11.2007.
PERSONS PRESENT AT THE TEST:		REPORT SENT/DELIVERED: András Pásztor, NYÍR-MIX-TRADE LTD
DATE OF ISSUE OF THE ORIGINAL REPORT: 23.11.2007.	DATE OF ISSUE OF THE COPY EQUAL TO THE ORIGINAL:	L.S.
TEST PERFORMED BY:  Testing Engineer, Gábor Somogyi		CHECKED AND APPROVED BY:  Leader of the Lab, Dr. Tibor Mihálovics

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DATA OF THE TEST PIECE:	
MANUFACTURER/TYPE/SERIAL NUMBER:	NYÍR-MIX-TRADE LTD/KBSZ 24/E/2006 – 0002
NOMINAL VOLTAGE:	24 kV
NOMINAL CURRENT:	63 A
NOMINAL DYNAMIC LIMIT CURRENT:	15kA

INFOWARE work number: IWS 070119

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257

1. SUMMARY OF THE TEST RESULTS

Since the 15 kA nominal dynamic limit current guaranteed for the fuse carrier of KBSZ 24/E type cannot be proven with the cut current of < 2ms arc duration and 7-8 kA peak value of the fuse cartridge of 63A rated current, the short-circuit connection was done with a 45 mm diameter Cu pipe of 1.5 mm wall thickness.

During the connection done with

**15.4kA<sub>peak</sub> – 16.5ms**

parameters, no arcing or movement was experienced. The voltage measured between the poles of the test piece did not show any sign indicating arcing, either. It is certified by the conformity of the resistances measured on the test piece before and after the short-circuit connection as well as the photos no. 2 and 3 taken of the terminals after the connection that the test piece managed to endure the stresses caused by the short-circuit connection of 15.4kA<sub>peak</sub> for a longer time than specified.

*Drawings supplied for the identification of the test piece:*

Fuse carrier	B 24 – 01/1
20 kV artificial resin insulator	K 24 – 10/1
Cartridge holder	B 24 – 03/1

NUMBERED PAGE: 11	OSCILLOGRAM: 2	PHOTO: 3
PICTURE: -	CHART: 2	DRAWING: 3

Standards applied for the test:  
MSZ EN 60282-1:2006: High-voltage fuses. Part no. 1. Current-limiting fuses

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**2. TESTING SCHEDULE, REGULATIONS AND THE METHOD APPLIED**

Rated current of the KBSZ 24/E fuse carrier of 24kV nominal voltage is 63A. According to the catalogue of EFEN NNGk current limiting fuse cartridges, the peak value of the cut current limited by the EFEN / NNGk 67740.0630-type fuse cartridge of 24kV nominal voltage and 63A rated current generally used by domestic current suppliers is 7-8kA<sub>peak</sub> in independent circuit of fault current of max. 16kA<sub>eff</sub> occurring in domestic 22-kV networks. The melting time of the cartridge is < 2ms. So the specified ≥ 15kA rated dynamic limit current cannot be certified by the fusing of the 63-A fuse cartridge in a fault current circuit.

Since our purpose is to certify the specified short-circuit proofness parameters of the carrier, in concert with the client we performed the short-circuit proofness test with a Cu pipe of 45mm diameter and 1.5mm wall thickness placed in the fuse carrier of KBSZ 24/E type, applying reasonably Point 6.6 of the relevant MSZ EN 60282-1 (IEC 60282-1) standard.

**3. DESCRIPTION OF TESTS**

The test circuit was established in accordance with Point 6.6.1.5 and Picture 2 of MSZ EN 60282-1 standard; it is shown in Photo no. 1. The test piece was connected to the circuit by means of a blank Cu rail of 30 x 4 mm<sup>2</sup> cross section.

The short-circuit connections performed are summarised in Table 1.

Radius order of the oscillograms:

- I<sub>p</sub> – short-circuit current
- U – voltage measured about 4 m from the poles of the test piece (its value is far lower for the first connection because of the short circuit placed nearer to the measuring points).

Serial number of connection	Number of oscillogram	Peak value of fault current	Duration of short circuit	Remark
1	071122-02	16.0kA	116ms	Set of current with short-circuiting before the test piece
2	071122-04	15.4kA	16.5ms	Successful

During the short-circuit connection, no arcing, movement was experienced. The voltage measured between the poles of the test piece did not show any sign indicating arcing, either. The resistances between the terminals of the test piece before and after the short-circuit connection measured with about 10A<sub>dc</sub> were as follows:

- before the short-circuit connection: 133.5 μohm
- after the short-circuit connection: 131 μohm

**Evaluation of the test:**

During the short-circuit connection, no arcing, movement was experienced. The voltage measured between the poles of the test piece did not show any sign indicating arcing, either. It is certified by the conformity of the resistances measured on the test piece before and after the short-circuit connection as well as the photos no. 2 and 3 taken of the terminals after the connection that the test piece managed to endure the stresses caused by the short-circuit connection of 15.4kA<sub>peak</sub> for a longer time than specified.

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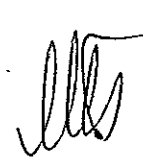
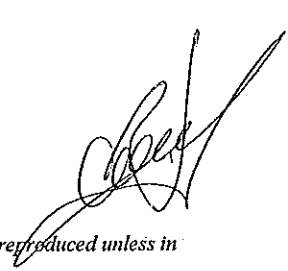
4. EQUIPMENT, MEASURING DEVICES USED DURING THE TEST

Table 2: Measuring devices used for the test

DESCRIPTION	MANUFACTURER/TYPE	SERIAL NUMBER	NUMBER OF THE CALIBRATION/CONTROL DOCUMENT
TRANSIENT RECORDER	HS / ITR-7068	001	MKJ07L10
SHORT-CIRCUIT CHANGER 100.000/25A	SMIT NIJMEGEN / ASK SPEC	52.68692	MKJ05 L076
		52.68691	
		52.68693	
MULTIMETER	HP / 34401A	US36032819/97	0116/2007
MULTIMETER	HP / 34401A	3146a32584	0115/2007

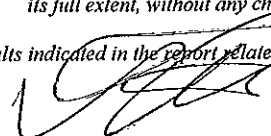
The result of the measurements made with the equipment and/or measuring tools in accordance with the calibration or control documents can be traced back to the national etalon.

- Error of measurement of fault current:  $\leq \pm 1\%$
- Error of measurement of fault current having a direct current component:  $\leq \pm 2\%$
- Error of voltage measurement:  $\leq \pm 1\%$
- Error of resistance measurement:  $\leq \pm 1\%$

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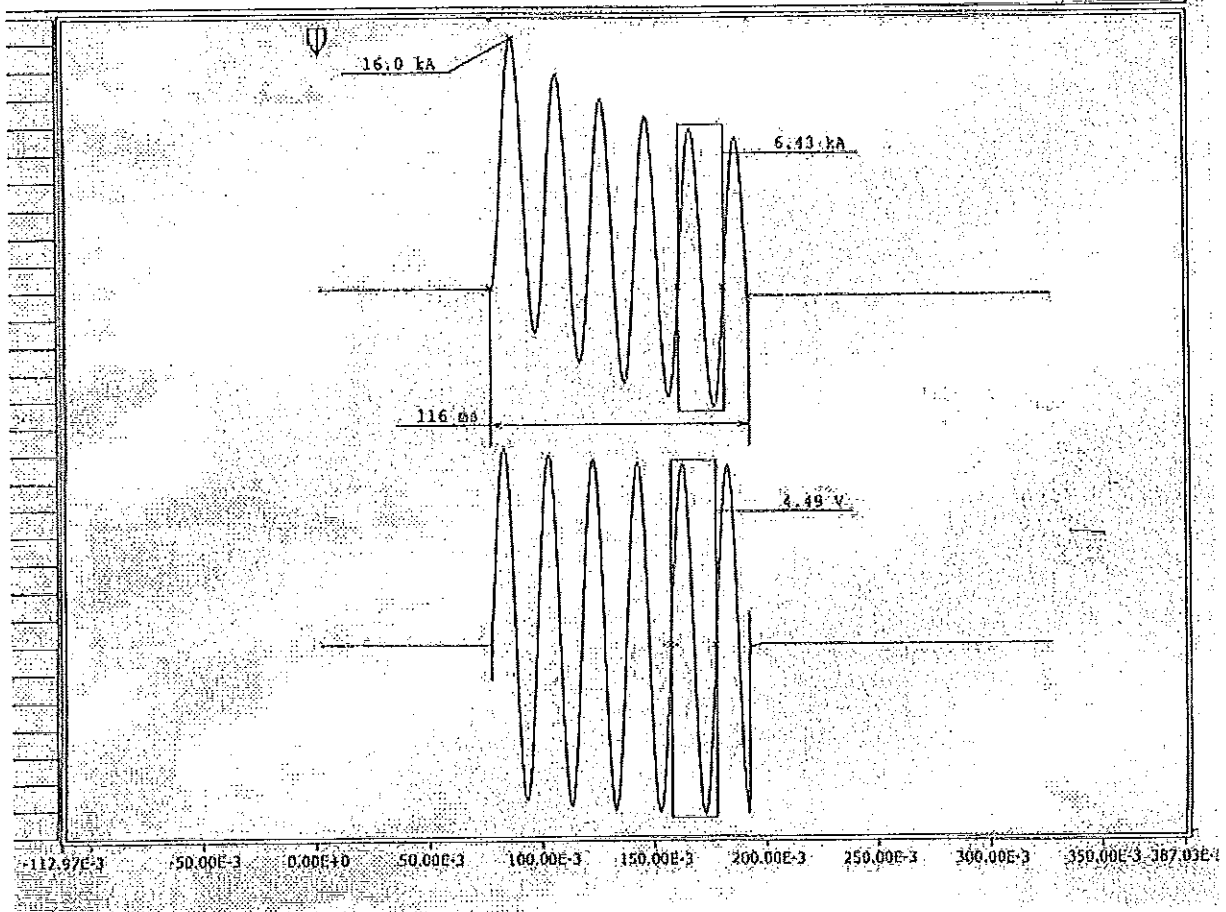
*The results indicated in the report relate only to the tested device, equipment.*






FILE NAME	DATE OF REGISTERING	NOTE	DATE OF PRINTING
Measurement 2			

Oscillogram no. 071122-02



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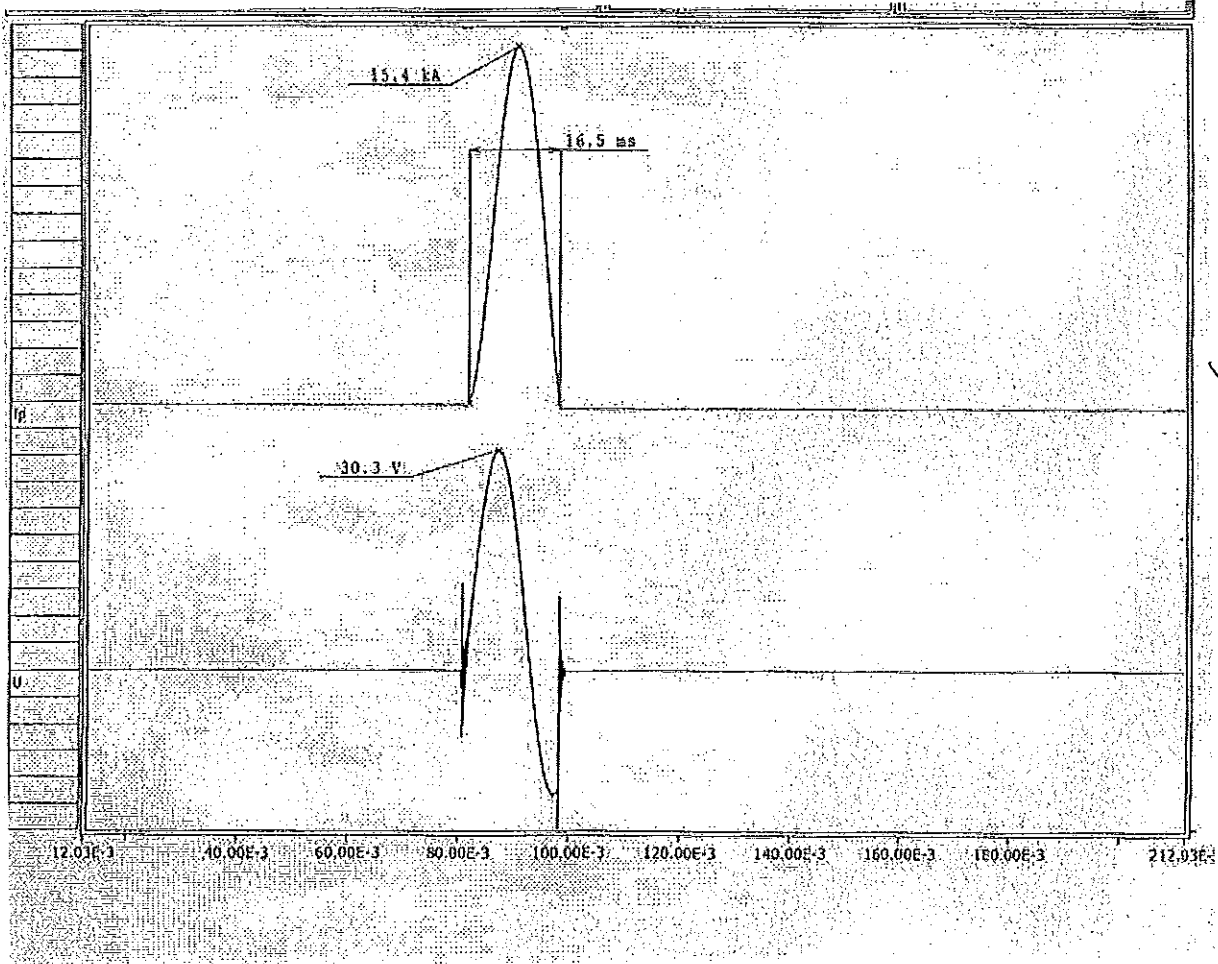
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- 255 -

FILE NAME      DATE OF REGISTERING      NOTE      DATE OF PRINTING  
Measurement 4

Oscillogram no. 071122-04



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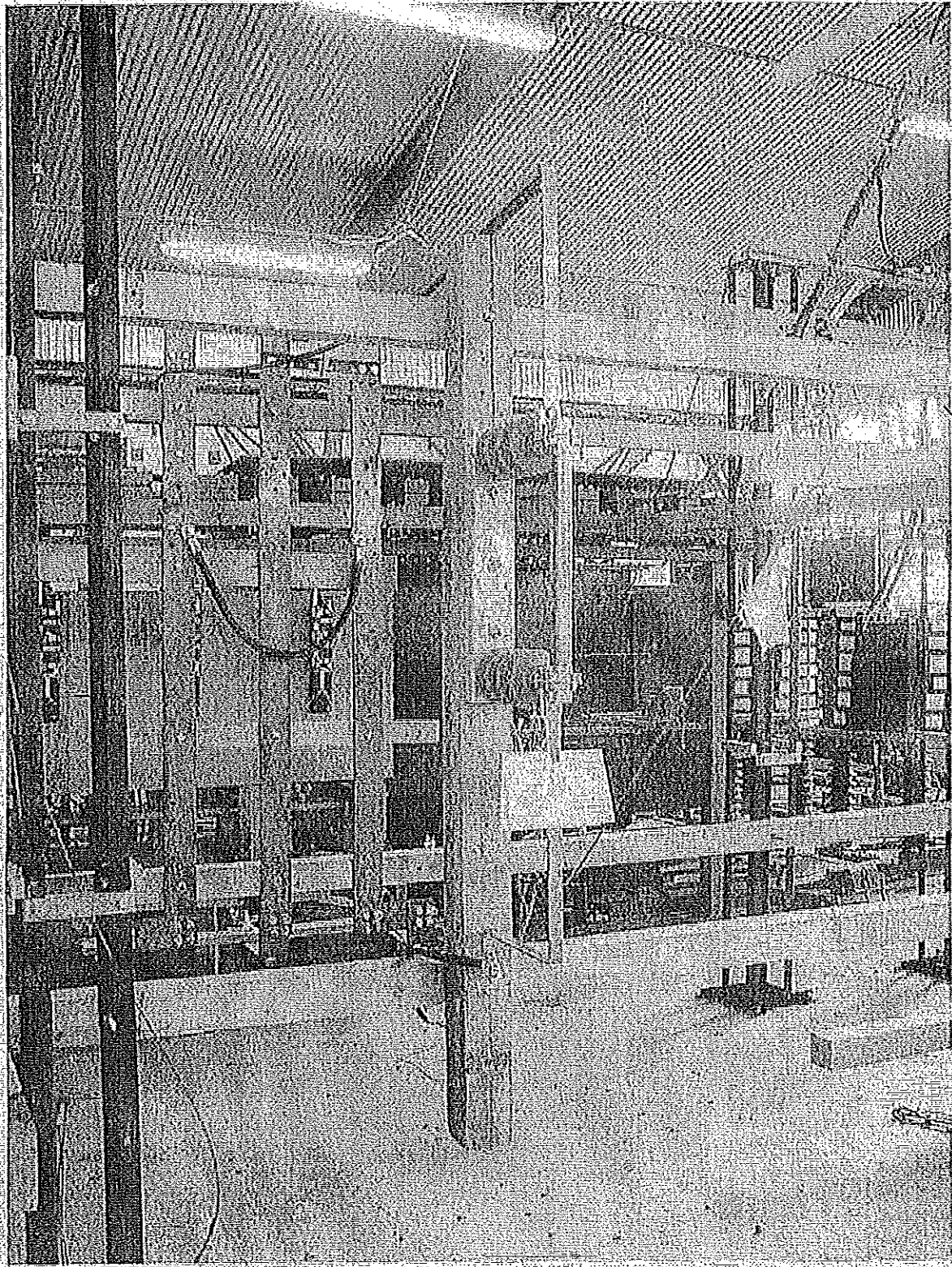
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Photo no. 1: Circuit configuration, location of test piece

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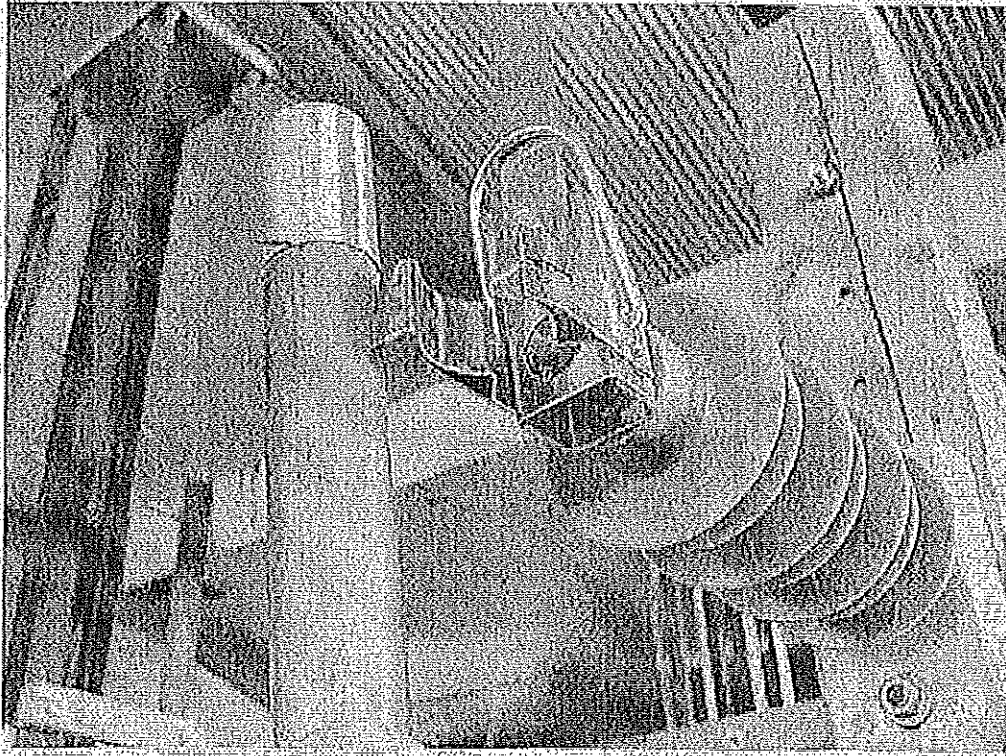
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*The results indicated in the report relate only to the tested device, equipment.*

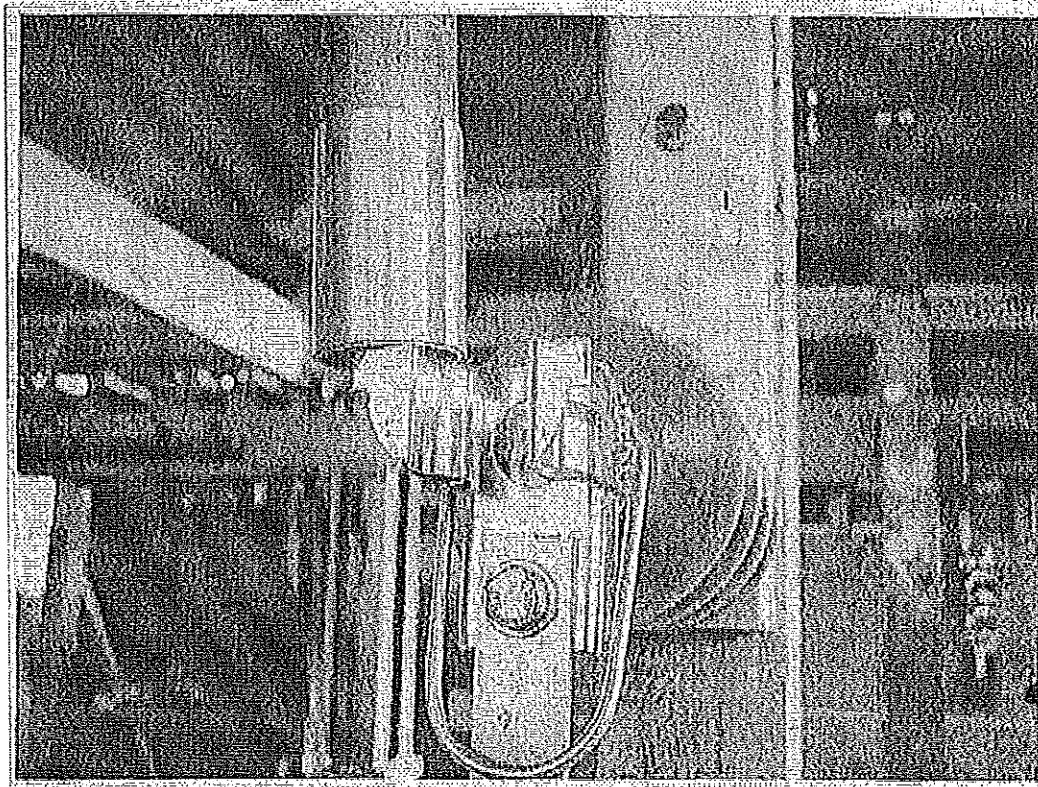
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Photo no. 2: Upper spring contactor and the taken-out Cu pipe after connection



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Photo no. 3: Lower spring contactor and the taken-out Cu pipe after connection

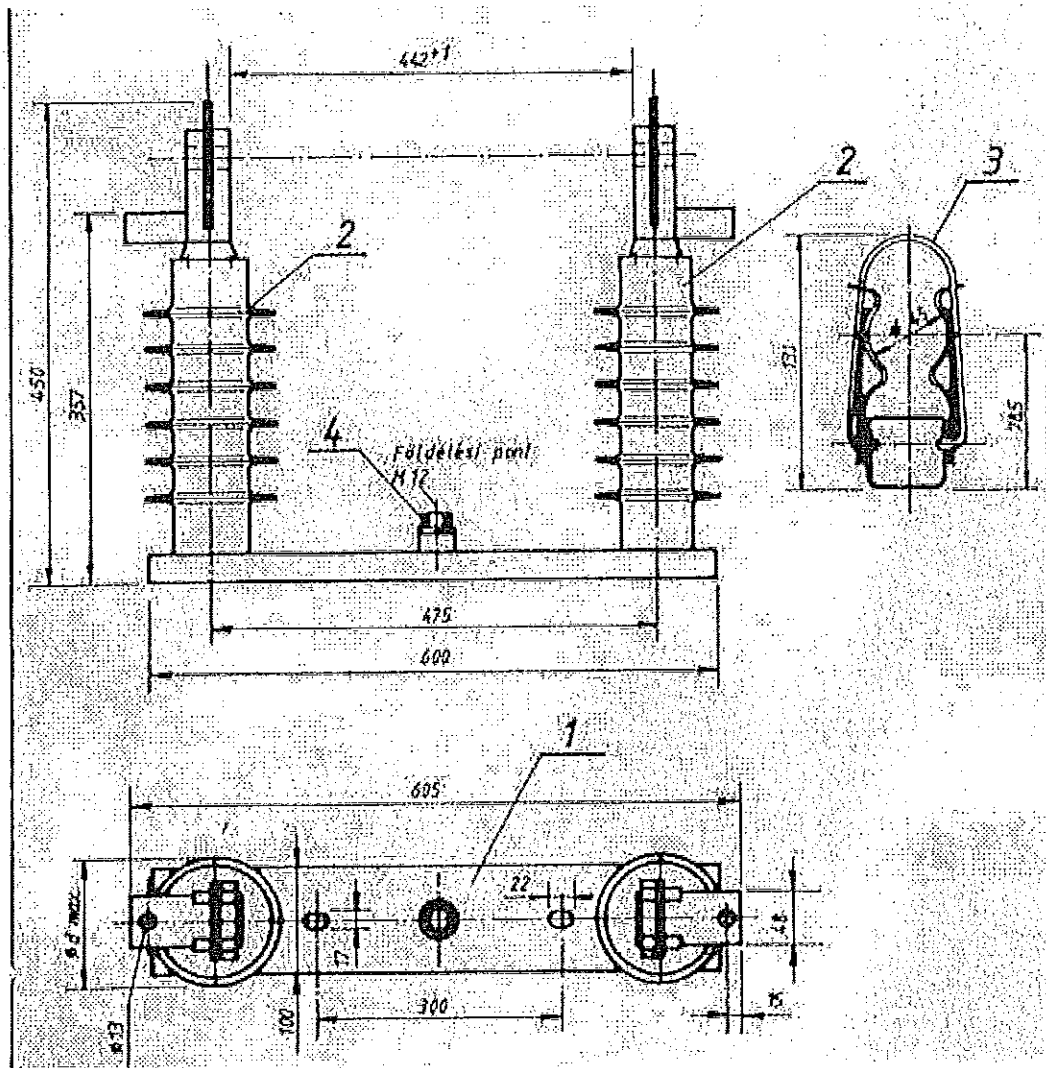
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*The results indicated in the report relate only to the tested device, equipment.*

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*2007*

Earthing point



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Manufacturer		Nyír-Mix-Trade Ltd			
Date		31.03.2006			
4	1	Earthing screw	M 12x35	KO	
3	2	Cartridge holder	Ø45x131	KO	
2	2	Poxi insulator	KT2-125	Epoxi	X 100
1	1	U bottom plate	Th3x600x1000	A 60	Dip galvanized.
Item	Pc.	Description	Size	Material	Remark
Designer:		Description:			Scale:
Drawn by:		<b>Fuse carrier</b>			Sheet size: A/4
Checked by:		Type:	Drg. No.:	Material:	
		KBSZ 24/E	B 24 - 01/1		

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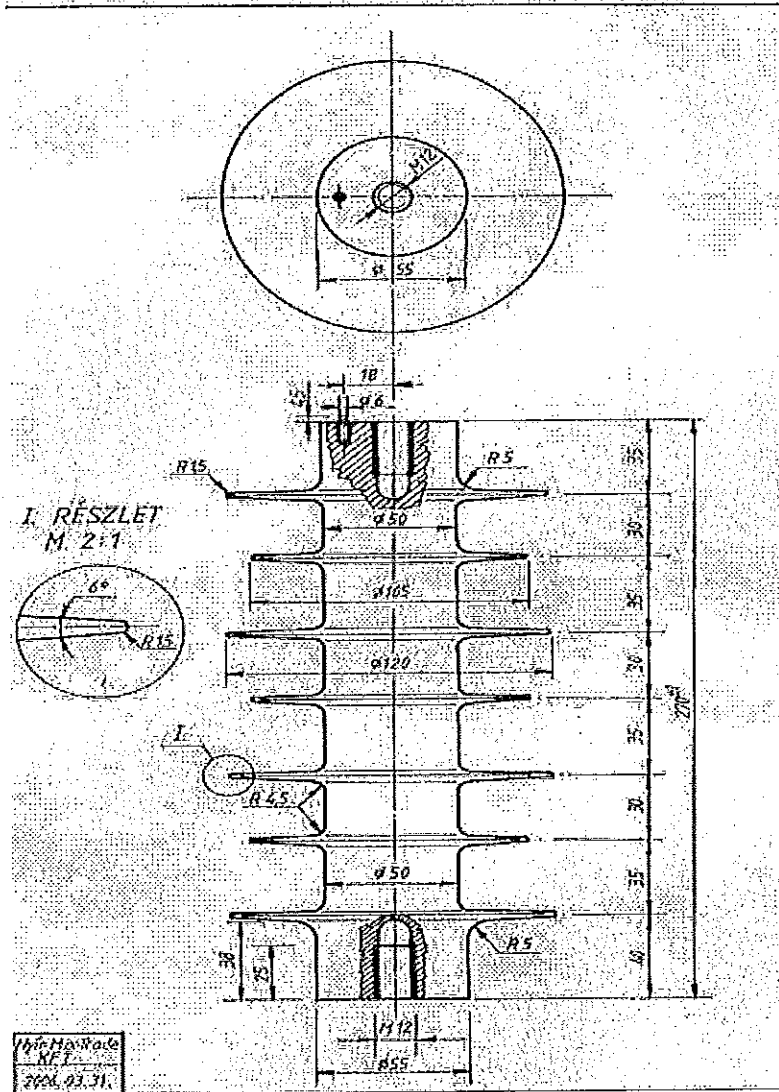
*The results indicated in this report relate only to the tested device, equipment.*

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*Handwritten number 230*

DETAIL NO. 1  
M 2:1



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Manufacturer	Nyr-Mix-Trade Ltd		
Date	31.03.2006		
Designer:	Description:		Scale: M 1:2
Drawn by:	<b>20 kV artificial resin device insulator</b>		Sheet size: A/4
Checked by:	Type:	Drg. No.:	Material:
	KT2-125	K 24 - 10/1	Epoxy resin X100

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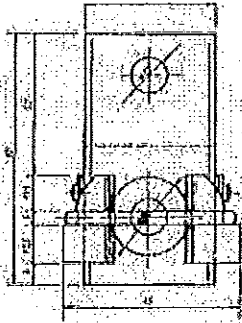
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*Handwritten signature*

*The results indicated in the report relate only to the tested device, equipment.*

2007

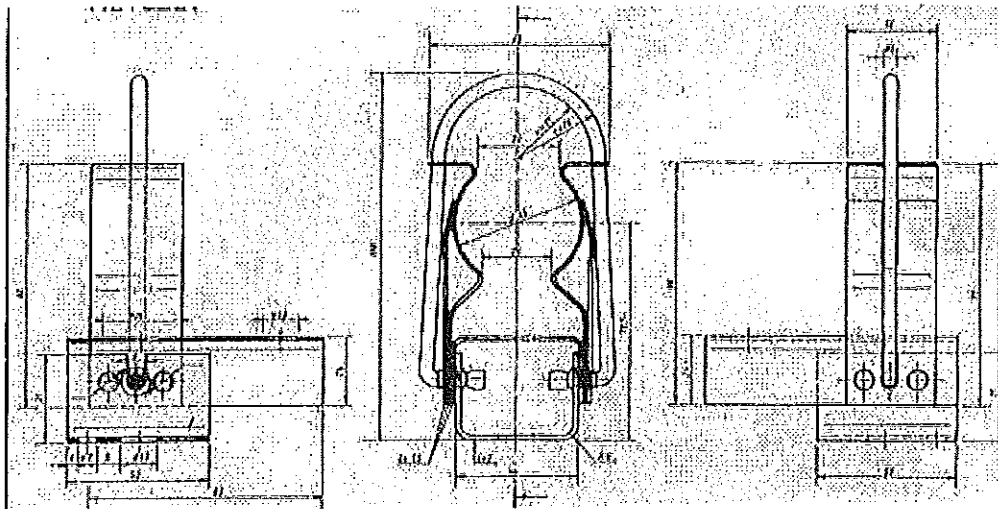
TOP VIEW M = 1:2



SECTIONAL DRAWING

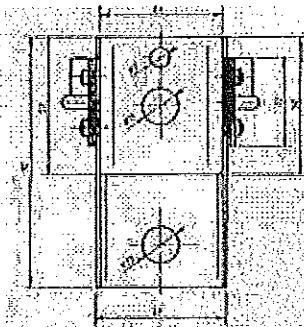
FRONT VIEW M = 1:2

SIDE VIEW M = 1:2



*[Handwritten signature]*

BOTTOM VIEW M = 1:2



*[Handwritten signature]*

Manufacturer	Nyfirmix-Trade Ltd			Scale: M 1:2
Date	31.03.2006			Sheet size: A/4
Designer:	Description: <b>Cartridge holder</b>			Material: KO
Drawn by:				
Checked by:	Type: KBSZ 24/TF	Dr. No.:	B 24 - 03/1	

*[Handwritten signature]*

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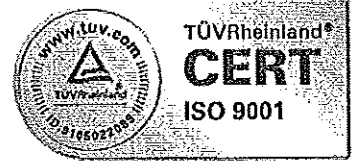
*The results indicated in the report relate only to the tested device, equipment.*

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Примоден № 16



Всичко за енергетиката от една ръка



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## ИНСТРУКЦИЯ ЗА ТРАНСПОРТИРАНЕ, МАНИПУЛИРАНЕ, СКЛАДИРАНЕ, ЕКСПЛОАТАЦИЯ И ПОДДЪРЖАНЕ на ОСНОВИ ЗА ПРЕДПАЗИТЕЛИ тип KBSZ ОТКРИТ И ВЪТРЕШЕН МОНТАЖ

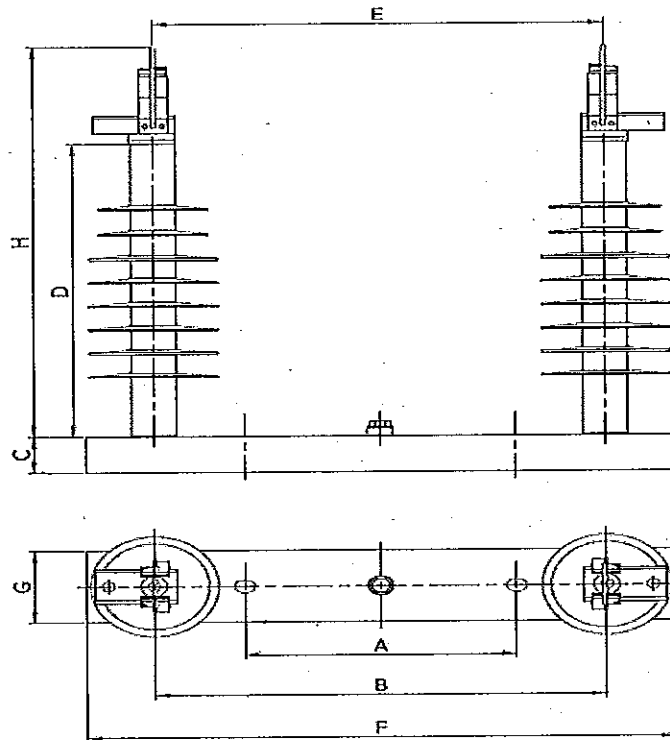
Настоящата инструкция се отнася за въвеждане в експлоатация, експлоатация, техническо обслужване, транспортиране и складиране на основи за високоволтови предпазители за открит и вътрешен монтаж тип KBSZ.

### 1. Технически характеристики:

#### 1.1. Предназначение

Основите за високоволтови предпазители за открит и вътрешен монтаж тип KBSZ са предназначени за монтиране на предпазителите в електрическата верига, осигурявайки надежден контакт и по този начин безотказната им работа.

#### 1.2. Габаритни размери и означения на основи тип KBSZ.



#### 1.3. Конструкция

Основите за високоволтови предпазители за открит и вътрешен монтаж тип KBSZ се състоят от следните основни елементи:

- греда от шанцована и огъната стомана
- подпорни изолятори два броя

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- тоководещи контактни системи два броя

Рамата има отвори за закрепване върху носещата конструкция и отвор за заземяване.

Подпорните изолатори се използват в зависимост от вида на монтажа, напрежението и изрични указания на експлоатиращите изделията.

Тоководещите контактни системи осигуряват чрез пружина достатъчен натиск върху контактните втулки на предпазителя.

## 2. Монтаж

Основите се монтират върху стоманена (винкелова или „П“-профилна) основа посредством болтови съединения. При монтирането на основата е необходимо да се спазват следните минимални светли разстояния от тоководещите части до различните елементи на закритите разпределителни уредби.

Нормирано разстояние	Изоляционно разстояние мм	
	Номинално напрежение кV	
	10	20
От тоководещите части до плътни огради	180	250
От тоководещите части до мрежести огради	280	310

## 3. Въвеждане в експлоатация.

### 3.1. Първоначални проверки:

3.1.1. Проверяват се напреженията на които са подложени изолаторите от съединителните шини или проводници.

- огъващите усилия върху изолаторите не трябва да превишават 10% от разрушаващата сила на изолаторите.

- при връзките изпълнени с твърди шини да се предвиждат компенсатори на удълженията при промяна на околната температура.

3.1.5. Проверка на налягането на контактите – проверява се наличие на усилие на притискане на щипката към контактната втулка на предпазителя.

## 4. Експлоатационни изисквания

По време на експлоатация се следи за състоянието на :  
подпорните изолатори  
контактите

4.1. Огледи – огледите на основите се извършват заедно с огледите на разединителите.

4.2. Ремонти – текущите и плановите ремонти се извършват заедно с разединителите.

## 5. Техника на безопасност

5.1. При смяна на предпазител да се изключва съответния разединител.

5.2. За предпазване от грешни манипулации е необходимо да са в изправност блокировките на входните врати на килиите (когато се работи в закрити помещения) и да се работи по двама с наряд (при работа на открито).

## 6. Транспортиране и съхранение на склад.

Основите за високоволтови предпазители за вътрешен монтаж се съхраняват в сухи и закрити помещения при температури не по-ниски от  $-5^{\circ}\text{C}$ , а тези за открит монтаж може и на открито при температури не по-ниски от  $-25^{\circ}\text{C}$  в подходящи опаковки – дървени каси.

При складиране и подреждане на основите за предпазители, опаковките не трябва да се поставят една върху друга на повече от три реда във височина, като палетите трябва да се поставят само на дъно (не на страничните стени).

При транспортиране основите за високоволтови предпазители трябва да се фиксират неподвижно посредством самонарезни винтове или болтове.

**Срокове за доставка**

№	Наименование на материал	Миним. размер на партида, бр.	Количества със срок на доставка до 7 календарни дни, бр.	Количества със срок на доставка 30 дни, бр.
1	2	3	4	5
1	Предпазител СН, 12 kV, 45/292 mm, 4A	3	3	12
2	Предпазител СН, 12 kV, 45/292 mm, 6.3A	3	3	12
3	Предпазител СН, 12 kV, 45/292 mm, 10A	3	3	12
4	Предпазител СН, 12 kV, 45/292 mm, 16A	3	9	36
5	Предпазител СН, 12 kV, 45/292 mm, 20A	3	9	36
6	Предпазител СН, 12 kV, 45/292 mm, 25A	3	9	36
7	Предпазител СН, 12 kV, 45/292 mm, 31.5A	3	12	45
8	Предпазител СН, 12 kV, 45/292 mm, 40A	3	18	63
9	Предпазител СН, 12 kV, 45/292 mm, 50A	3	18	63
10	Предпазител СН, 12 kV, 45/292 mm, 63A	3	12	45
11	Предпазител СН, 12 kV, 45/292 mm, 80A	3	6	24
12	Предпазител СН, 12 kV, 45/292 mm, 100A	3	3	6
13	Предпазител СН, 12 kV, 45/442 mm, 4A	3	3	12
14	Предпазител СН, 12 kV, 45/442 mm, 6.3A	3	3	12
15	Предпазител СН, 12 kV, 45/442 mm, 10A	3	3	12
16	Предпазител СН, 12 kV, 45/442 mm, 16A	3	9	36
17	Предпазител СН, 12 kV, 45/442 mm, 20A	3	9	36
18	Предпазител СН, 12 kV, 45/442 mm, 25A	3	9	36
19	Предпазител СН, 12 kV, 45/442 mm, 31.5A	3	12	42
20	Предпазител СН, 12 kV, 45/442 mm, 40A	3	18	63
21	Предпазител СН, 12 kV, 45/442 mm, 50A	3	18	63
22	Предпазител СН, 12 kV, 45/442 mm, 63A	3	12	42
23	Предпазител СН, 12 kV, 45/442 mm, 80A	3	6	21
24	Предпазител СН, 12 kV, 45/442 mm, 100A	3	3	6
25	Предпазител СН, 24 kV, 45/442 mm, 4A	3	6	18
26	Предпазител СН, 24 kV, 45/442 mm, 6.3A	3	6	15
27	Предпазител СН, 24 kV, 45/442 mm, 10A	3	21	81
28	Предпазител СН, 24 kV, 45/442 mm, 16A	3	33	123
29	Предпазител СН, 24 kV, 45/442 mm, 20A	3	33	123
30	Предпазител СН, 24 kV, 45/442 mm, 25A	3	27	105
31	Предпазител СН, 24 kV, 45/442 mm, 31.5A	3	33	123
32	Предпазител СН, 24 kV, 45/442 mm, 40A	3	30	111
33	Предпазител СН, 24 kV, 45/442 mm, 50A	3	27	105
34	Предпазител СН, 24 kV, 45/442 mm, 63A	3	27	108
35	Предпазител СН, 24 kV, 45/442 mm, 80A	3	12	42
36	Основа за предпазител 20 kV, OM	3	24	93
37	Основа за предпазител 20 kV, 3M	3	24	93
38	Основа за предпазител 10 kV, 3M	3	6	24

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Дата : 04.01.2016 г.

**ПОДПИС И ПЕЧАТ:**

*(име и фамилия)*

Управител

*(длъжност на представляващия участника)*

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**ОПАКОВКА**

№	Наименование на материал	Миним. размер на партида, бр.	Вид опаковка	Брой на стоката в опаковка	Размери на опаковката (д/ш/в),мм	Бруто тегло на 1 (един) брой опаковка със стоката, кг.
1	Предпазител СН,12 kV, 45/292 mm, 4A	3	картонена кутия	1	60x60x360	1.700
2	Предпазител СН,12 kV, 45/292 mm, 6.3A	3	картонена кутия	1	60x60x360	1.700
3	Предпазител СН,12 kV, 45/292 mm, 10A	3	картонена кутия	1	60x60x360	1.700
4	Предпазител СН,12 kV, 45/292 mm, 16A	3	картонена кутия	1	60x60x360	1.700
5	Предпазител СН,12 kV, 45/292 mm, 20A	3	картонена кутия	1	60x60x360	1.700
6	Предпазител СН,12 kV, 45/292 mm, 25A	3	картонена кутия	1	60x60x360	1.850
7	Предпазител СН,12 kV, 45/292 mm, 31.5A	3	картонена кутия	1	60x60x360	1.850
8	Предпазител СН,12 kV, 45/292 mm, 40A	3	картонена кутия	1	60x60x360	2.350
9	Предпазител СН,12 kV, 45/292 mm, 50A	3	картонена кутия	1	60x60x360	2.350
10	Предпазител СН,12 kV, 45/292 mm, 63A	3	картонена кутия	1	60x60x360	2.350
11	Предпазител СН,12 kV, 45/292 mm, 80A	3	картонена кутия	1	70x70x360	2.350
12	Предпазител СН,12 kV, 45/292 mm, 100A	3	картонена кутия	1	70x70x360	2.350
13	Предпазител СН,12 kV, 45/442 mm, 4A	3	картонена кутия	1	60x60x540	2.400
14	Предпазител СН,12 kV, 45/442 mm, 6.3A	3	картонена кутия	1	60x60x540	2.400
15	Предпазител СН,12 kV, 45/442 mm, 10A	3	картонена кутия	1	60x60x540	2.400
16	Предпазител СН,12 kV, 45/442 mm, 16A	3	картонена кутия	1	60x60x540	2.400
17	Предпазител СН,12 kV, 45/442 mm, 20A	3	картонена кутия	1	60x60x540	2.400
18	Предпазител СН,12 kV, 45/442 mm, 25A	3	картонена кутия	1	60x60x540	2.400
19	Предпазител СН,12 kV, 45/442 mm, 31.5A	3	картонена кутия	1	60x60x540	2.400
20	Предпазител СН,12 kV, 45/442 mm, 40A	3	картонена кутия	1	60x60x540	2.400
21	Предпазител СН,12 kV, 45/442 mm, 50A	3	картонена кутия	1	60x60x540	2.500
22	Предпазител СН,12 kV, 45/442 mm, 63A	3	картонена кутия	1	60x60x540	2.500
23	Предпазител СН,12 kV, 45/442 mm, 80A	3	картонена кутия	1	70x70x540	2.500
24	Предпазител СН,12 kV, 45/442 mm, 100A	3	картонена кутия	1	70x70x540	2.500
25	Предпазител СН, 24 kV, 45/442 mm, 4A	3	картонена кутия	1	60x60x540	2.500
26	Предпазител СН, 24 kV, 45/442 mm, 6.3A	3	картонена кутия	1	60x60x540	2.500
27	Предпазител СН, 24 kV, 45/442 mm, 10A	3	картонена кутия	1	60x60x540	2.500
28	Предпазител СН, 24 kV, 45/442 mm, 16A	3	картонена кутия	1	60x60x540	2.500
29	Предпазител СН, 24 kV, 45/442 mm, 20A	3	картонена кутия	1	60x60x540	2.500
30	Предпазител СН, 24 kV, 45/442 mm, 25A	3	картонена кутия	1	60x60x540	2.500
31	Предпазител СН, 24 kV, 45/442 mm, 31.5A	3	картонена	1	60x60x540	2.500

			кутия			
32	Предпазител СН, 24 kV, 45/442 mm, 40A	3	картонена кутия	1	60x60x540	3.300
33	Предпазител СН, 24 kV, 45/442 mm, 50A	3	картонена кутия	1	60x60x540	3.300
34	Предпазител СН, 24 kV, 45/442 mm, 63A	3	картонена кутия	1	70x70x540	3.300
35	Предпазител СН, 24 kV, 45/442 mm, 80A	3	картонена кутия	1	70x70x540	3.300
36	Основа за предпазител 20 kV, OM	3	картонена кутия	1		
37	Основа за предпазител 20 kV, 3M	3	картонена кутия	1		
38	Основа за предпазител 10 kV, 3M	3	картонена кутия	1		

Всички изисквания, свързани с опаковка, маркировка, съхранение и транспортиране, които не са посочени в таблицата по-горе или в отделен текст под нея, следва да бъдат изпълнени съгласно изискванията на техническите спецификации

Дата : 04.01.2016 г.

**ПОДПИС и ПЕЧАТ:**

\_\_\_\_\_  
(име и фамилия)  
Управител

(длъжност на представляващия участник)



