

İTHALAT - İHRACAT - MÜMESSİLLİK

akpulat ticaret

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Ankara 19.1.1978

İ.E.T.T.GENEL MÜDÜRLÜĞÜ

Ticari ve Mali İşleri Dairesi

TÜNEL-BEYOĞLU

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İ L G İ : 30.12.1977 Tarih ve 22633 sayılı yazılarınız.

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İNABA DENKİ Firmasından istenmiş olup, ekte tetkiklerinize sunulmuştur.
Bilgilerinizi rica ederiz.

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30 Ocak 1978
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Ticari ve Mali İşler
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ederiz.

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ÇAPRAZLI POLİETİLEN İZOLASYONLU
KABLOLAR KONUSUNDAKİ SORULARINIZA
CEVAP.

INABA DENKI SANGYO CO.LTD.
4-6, HONDEN-ICHOME,
NISHI-KU.OSAKA, JAPAN.

Tanggal : 12 April 1998
No. : 1 - 7812

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GABARILLI POLITEKNIK ISOLASIONIN
KABUPATEN KUNUSUNDAKI SORULANINIA
GABAR.

WASHI-KU. OSAKA, JAPAN.
4-6, HONDAI-1CHOME,
IMABA DENKI SANGYO CO. LTD.

DATE : JAN. 12, 1978.

No. J - 7812

REPLY AGAINST YOUR QUESTIONS ON THE
CROSS-LINKED POLYETHYLENE INSULATED
CABLE.

INABA DENKI SANGYO CO. LTD.

4-6, HONDEN-1CHOME,
NISHI-KU. OSAKA, JAPAN.

NISHI NIPPON ELECTRIC WIRE & CABLE CO., LTD.

OITA JAPAN

DATE OF ISSUE

NO.

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INABA DENKI SANGYO CO. LTD.
4-6 HONDEN-ICHOME,
NISHI-KU, OSAKA, JAPAN.

INABA DENKI SANGYO CO. LTD.
4-6 HONDEN-ICHOME,
NISHI-KU, OSAKA, JAPAN.

1. Possibility of water invasion from the broken PVC outer sheath cable

This is sufficiently protected with the steel tape armour from external mechanical forces with which the cable will often encounter at its laying. Therefore, even if the cable is rather roughly handled in the course of its laying, the outer PVC sheath may be broken, but it is very rare that the inner PVC sheath also might be broken.

(1) In case of only the outer PVC sheath's damage

In this case, as the inner PVC sheath remains unbroken, even if some water penetrate through a Broken outer PVC sheath, the water does not invade inside beyond the inner PVC sheath. Therefore, as the water does not reach up to the insulation, the water does not badly influence upon the characteristics of cable.

However, immediately when you find out such the broken spots, repair water-tightly such the broken spots with an adhesive plastic tape or the like and by other ways.

(2) In case of the outer and inner PVC sheaths' damage

This case is very very rare, but when this rare accident occurs, water can easily penetrate through their Broken spots and reach the insulation. In this case, if the cables are insulated with usual cross-linked polyethylene produced with the widely used conventional steam-curing process, water trees may occur in the insulation within a few years. These water trees gradually grow and finally make the cable puncture in about 5 ~ 7 years.

However, this 35KV cable was insulated with special cross-linked polyethylene produced with the very unique dry-type curing process.

Therefore, the water treeing resistance of this 35KV cable is considerably larger than that of the above-mentioned cables.

Unfortunately, water trees occur in this 35KV cable, it will surely take a longer time up to its puncture, but it is impossible to avoid its puncture. However, in order to realize this rare case, you must add very very strong external mechanical forces to the cable.

Therefore, if this accident occurs during the laying of cable, the worker, who is laying the cable, will easily notice the accident. In this case, it is supposed that the insulation also is damaged.

If the insulation is damaged, you must cut off the broken part from the unbroken part and joint the unbroken cables each other. If the insulation is not damaged, it is enough that only the broken outer PVC sheath is water-tightly repaired.

In any way, if the cable punctures in operation because the above-mentioned accidents were not found during its laying, you must detect the punctured spot with an appropriate fault locating device and repair it.

6.4. | 4135/3

Possibility of water invasion from the broken PVC outer sheath

It is possible that water could penetrate through the broken PVC outer sheath and reach the inner PVC sheath. This is because the broken PVC outer sheath is not perfectly sealed and water can seep through the cracks. The inner PVC sheath is also not perfectly sealed and water can seep through the cracks. Therefore, water can reach the inner PVC sheath through the broken PVC outer sheath.

(1) In case of only the outer PVC sheath's damage, in this case, as the inner PVC sheath remains unbroken, even if some water penetrates through a broken outer PVC sheath, the water does not reach the inner PVC sheath. Therefore, as the water does not reach up to the insulation, the water does not reach the conductors of the cable. However, immediately when you find out such a broken spot, repair it immediately with the broken spots with an adhesive plastic tape or by other ways.

(2) In case of both the outer and inner PVC sheath's damage, in this case, as the inner PVC sheath is also broken, water can reach the inner PVC sheath through the broken spots and reach the insulation. In this case, if the cables are insulated with water-resistant insulation, water does not reach the conductors of the cable. However, if the cables are insulated with ordinary insulation, water does reach the conductors of the cable. In this case, water gradually reaches the conductors of the cable and finally causes a short circuit. In this case, the cables should be replaced with special cross-linked polyethylene (XLPE) cables with the very high dielectric strength. The water-resisting resistance of this XLPE cable is much higher than that of the cross-linked cables. Therefore, if water does reach the inner PVC sheath, it will not reach the conductors of the cable. However, it is important to check the cables regularly in order to realize this case, you must check the cables very often. Therefore, if this accident occurs during the laying of cables, the workers should be very careful and the insulation should be checked. In this case, it is supposed that the insulation is damaged. If the insulation is damaged, you must cut off the broken part from the cables and join the unbroken cables each other. If the insulation is not damaged, it is enough that only the broken outer PVC sheath is immediately repaired. In any case, the cables must be in operation because the cables are not found during the laying, you must detect the cables immediately.

2. Characteristics change of water invasion cable

As already mentioned, even if water invade inside of the cable through broken outer PVC sheath or unappropriately completed joint boxes, cross-linked polyethylene is not spoiled in a short time (for example a few years ~ decade), because cross-linked polyethylene is very very excellent material with considerably high water resistance.

3. Possibility of water invasion through the joint boxes

If the joints are not water-tightly completed strictly according to the correct manuel of jointing for this 35KV cable, there will be possibility of water invasion through the joint boxes.

In this case, it is very difficult to find out whether the completed joints are finished water-tightly or not. If the joint is not water-tightly finished, the cable will pucture at the joint in operation.

In this case, also, perhaps it will take as a long time as in case of the broken sheath.

If puncture occurs, you must detect the puctured joints with an appropriate fault locating device, cut off the punctured joints and newly joint the cables each other with a new jointing material.

However, you can easily avoid this accident by jointing the cables strictly according to the manual of jointing for this 35KV cable which was already submitted to you.

In Japan, a great quantity of the cross-linked polyethylene insulated power cables whose rated voltages are 22KV and above have been widely used for about 15 years. However, we have never heard about such the accidents due to water invasion, and we also have never experienced such the accidents on our own cables.

UNITED STATES BUREAU OF MINES

Characteristics of water invasion cables

As already mentioned, even if water enters inside of the cable sheath, the cable will not be damaged because of the excellent resistance to water of the cross-linked polyethylene. In fact, after a few years of use, the cable will still be in excellent condition with considerably high water resistance.

G.4. / 4135 / 4

Locating of water invasion through the joint boxes

If the joints are not water-tightly completed exactly according to the correct manual of joining for this 25KV cable, there will be possibility of water invasion through the joint boxes. In this case, it is very difficult to find out whether the completed joints are finished water-tightly or not. If the joint is not water-tightly finished the cable will produce at the joint in operation. In this case, perhaps it will take as a long time as in case of the other cables. If you find the water, you must detect the punctured joints with an appropriate leak locating device, not all the punctured joints and newly joints. You can easily avoid this matter by joining the cables exactly according to the manual of joining for this 25KV cable. However, you can easily avoid this matter by joining the cables exactly according to the manual of joining for this 25KV cable. However, you can easily avoid this matter by joining the cables exactly according to the manual of joining for this 25KV cable.

In fact, the great quantity of the cross-linked polyethylene finished cable whose rated voltage are 25KV and above have been already used for about 15 years. However, we have never heard about such cable failure due to water invasion, and we did have never experienced such a case in our cable.

1.- Yarık PVC dış kılıftan suyun sirayet etme imkânı

Bu kablo döşendiği yerde ekseriya karşılaşılabileceği harici mekanik güçlerden çelik band zırlı yeterli derecede korunmuştur. Bu itibarla, kablo döşenme sırasında daha ziyade kabaca idare edilmiş olsa dahi, dış PVC kılıfı yarılabilir, fakat PVC iç kılıfın da yarılması çok nadirdir. 2/18/11/10

1) Yalnız dış PVC kılıfın hasarı halinde

Bu halde, iç PVC kılıf yarılmamış kaldığından, yarık dış PVC kılıftan su nüfuz etmiş olsa dahi, su iç PVC kılıfın ötesinde içeriye sirayet etmez. Bundan dolayı, su izolasyona kadar varmadığından su kablonun karakteristiğine kötü vaziyette etken olmaz. Bununla beraber, böyle yarık yerleri bulduğumuz zaman, yarık yerleri su sızmaz şekilde yapışkan plâstik band veya benzeri yahut da diğer usûllerle derhal tamir ediniz.

2) Dış ve İç PVC kılıfların hasar görmesi halinde

Bu hal, çok nadirdir, fakat bu ender tesadüf meydana gelince su kolaylıkla yarık yerlerden nüfuz edebilir ve izolasyona varabilir. Bu durumda, şayet kablolar, geniş ölçüde kullanılan mutad buhar kürü işlemi ile imâl edilen çaprazlı polietilen ile izole edilmişlerse, bir kaç sene içinde izolasyonda su kristalleri vuku bulur. Bu su kristalleri tedricen gelişir sonunda takriben 5-7 senede kablonun izolasyonunu bozar. (delik açar)* Bununla beraber bu 35 kV kablo, çok nadir kuru tip kür işlemi ile imâl edilen özel bir çaprazlı polietilen ile izole edilmiştir. Bu itibarla, bu 35 kV kablonun su kristallenmesi mukavemeti yukarıda bahsedilen kablolarinkinden oldukça fazladır.

Maalesef su kristallenmesi bu 35 kV kabloda vuku bulur, şüphesiz delinmesine kadar çok zaman alacaktır, ancak delinmeden kaçınmak imkânsızdır. Bununla beraber bu nadir hali gerçekleştirmek için pek çok kuvvetli harici mekanik güçleri kabloya ilâve etmelisiniz. Bundan dolayı, kablonun döşenmesi sırasında bu olay meydana gelirse, kabloyu döşeyen işçi olayı kolaylıkla farkedecektir. Bu durumda, kablonun izolesinin de hasara uğradığı farzedilir. Eğer izole hasara uğramışsa, yarık kısmı, yarılmamış kısımdan kesip çıkartmalı ve yarılmamış kabloları birbirine eklemelisiniz. Şayet izolasyon hasar görmemişse, yalnız yarık dış PVC kılıfın su sızmaz şekilde onarılması kâfi gelecektir.

Yukarıda bahsedilen olayların, döşeme esnasında bulunmadığı hallerde için, kablo herhangi bir şekilde işletmede değersizliğini gösterirse, uygun bir arıza tesbit cihazı ile delinen yeri araştırmalı ve onu tamir

etmelisiniz.

2 . Su sirayet eden kablonun karakter deęisiklięi :

Fvvelce bahsedildięi gibi, su yarık dıř PVC kılıftan veya uygun yapılmayan ek kutularından kablonun ięine, sirayet etse dahi aprazlı polietilen kısa bir zamanda bozulmaz (örneęin bir ka sene- de, takr.10 senelik bir devreye eřit) zira, aprazlı polietilen, olduęa yüksek su mukavemeti ile ok fevkalade bir malzemedir.

3. Ek kutularından su sirayeti imkânı

Şayet ekler mükemmel şekilde, bu 35 kv kablonun eklenme- sine ait doęru el kitabına göre su sızmaz vaziyette yapılmamıřsa, ek kutularından suyun sirayet etmesi imkânı olacaktır. Bu durumda, yapılan eklerin su sızmaz şekilde ikmâl edilip edilmedięini bulmak ol güç olacaktır, eęer ek su sızmaz şekilde yapılmamıřsa, kablo iřlemede ekde delik aacaktır. Bu durumda, keza, belki de yarık kılıf halinde- ki gibi uzun zaman alacaktır.

Delik ama durumu meydana gelirse, delik aılan ekleri uygun bir arıza tesbit cihazı ile arařtırmayı delikli ekleri kesip ıkarmalı ve yeniden kabloları biribirine yeni bir ekleme malzemesi ile eklemelisiniz. Bununla beraber, kabloları, size verilen 35 kv kablonun eklenmesine ait el kitabına göre eklemek suretiyle bu olayın meydana gelmesinden kolaylıkla kaınabilirsiniz.

22 kv ve daha yukarı itibari voltajda olan aprazlı po- lietilen izoleli güç kablolarından ok büyük miktarda Japonya'da 15 senedenberi geniř ölçüde kullanılmaktadır. Bununla beraber, su sirayet etmesinden dolayı böyle olayları duymadıęımız gibi kendi kablolarımızda böyle olarlarla da karřılařmadık.

