



Türkiye

Offer Nr / Teklif No
19-IS-0650-34-B

TGK Order Nr / Sipariş No
712920939

Register Nr / Kayıt No
20 - IR - 0181

Inspection Report **Muayene Raporu**

No. 19-IS-0650-34-B-001 Rev. 00

ABRASION RESISTANCE TEST ACCORDING TO PD CEN/TR 15729:2010

This is to certify that the components as described here under have been inspected. Burada tanımlanan malzemelerin muayenelerinin yapıldığı belgelenmiştir.

Client/Müşteri : SUBOR BORU SAN. VE TİC. A.Ş.
Ahmetler Mahallesi, Şehit Mustafa Geyve Caddesi, No:15,
54430, Karapürçek / Sakarya / Türkiye

Project Name/Projenin Adı : Abrasion Resistance Test acc. to PD CEN/TR 15729:2010

Client's P.O. No./Contract No. : Signed order dated 20.11.2019
Müşteri Sip. No./ Sözleşme No

Manufacturer/İmalatçı : SUBOR BORU SAN. VE TİC. A.Ş.

Place of Inspection/ Muayene Yeri : SUBOR BORU SAN. VE TİC. A.Ş., Karapürçek / Sakarya

Date/Duration of Inspection : Start: 03.12.2019 End of test: 14.01.2020
Muayene Tarihi ve Süresi

Inspector's Name/ Denetçi Adı : Ayşegül Alkan

Date of Report Issued/Raporun Yayın Tarihi : 13.02.2020

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Denetim Raporu No

The following materials were inspected / Aşağıdaki malzemeler muayene edilmiştir:

DN 600 PN 1 SN 10000 Glassfiber Reinforced Polyester Pipe

Base of Inspection / Muayenenin Esası :

<u>Applicable Specification / Uygulanan Spesifikasyonlar</u>	<u>Rev.</u>	<u>Dated/Tarih</u>
- PD CEN/TR 15729	-	2010

Supplier Documents / Tedarikçi Dökümanları

- N/A

Inspection Documents / Muayene Dökümanları:

Add items and rows as required. / İhtiyaca göre ilave madde ve satır ekleyiniz.

acc. to/göre

- Clients – Purchase Order dated / tarihli 20.11.2019
- TÜV's Scope of Inspection / TÜV Denetim Kapsamı dated / tarihli
- ITP Plan No. Rev. dated / tarihli

Scope of Inspection / Muayene Kapsamı

If there exist insert the check list/items here / Varsa kontrol listesi/maddeleri buraya ekleyiniz.

The abrasion resistance test was carried out by the company Subor Boru San. ve Tic. A.Ş. according to PD CEN/TR 15729:2010 at the manufacturing site in Sakarya-Karapürçek.

The purpose of the test method is to determine the mean abrasion of the inner surface of GRP pipes after being subject to specified regime of abrasion using a special abrasive.

Deviation from the Standard / Exceptional Condition: The company has used quartz gravel as abrasive material instead of Corundum.

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1.) Identification of the test piece:

The test sample was a semi-circular channel cutted from a DN600 PN1 SN10000 pipe. Only one sample was used. Details of the test pipe are described below;

Description of the test pipe:

Producer	Subor Boru San. ve Tic. A.Ş.
Product name	Glassfiber Reinforced Polyester Pipe (GRP)
Intended use	Sewer pipe
Diameter	DN 600
Length	1000 mm

Test Material:

7100 g natural unbroken round-grained quartz gravel

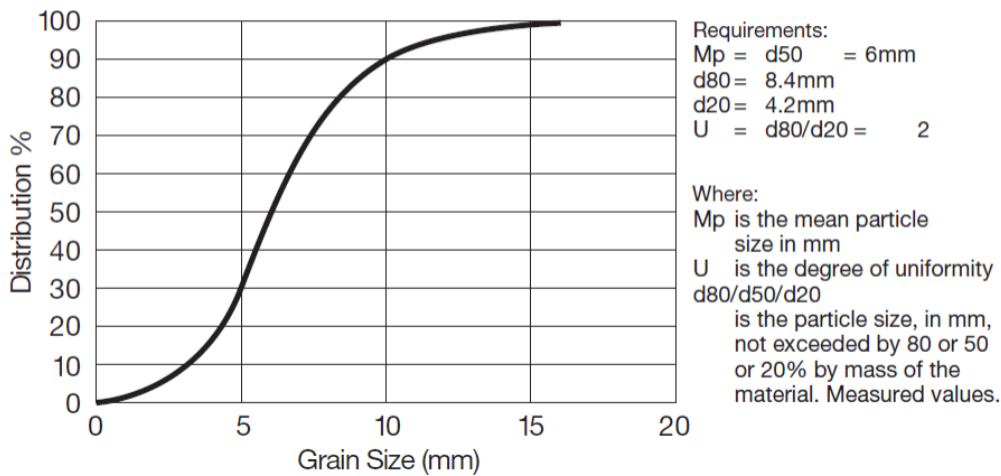


Fig.1 Particle distribution of abrasion charge



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2.) Test procedure:

The test was performed according to PD CEN/TR 15729:2010.

Before starting the test, 0-values were measured along the axis bottom line at 36 points. A distance of 150 mm from both ends of the test piece disregarded. This gives measurements for every 20 mm in the 700 mm mid-section. The measurements were done with a specially designed measuring device equipped with a 0.001 scaled digital dial indicator.

The sample was closed by the ends to make it watertight during the test. It was installed into the tilting frame and filled with the gravel/water mixture. The test sample was tilted alternately in the longitudinal direction through $\pm 22.5^\circ$ to achieve the abrasive action by the movement of the test material. Starting from -22.5 to $+ 22.5$ and returning to the starting position hereby completes one cycle.

After 50.000 cycles the tilting was interrupted, the water and abrasive was removed and measurements were taken as described above.

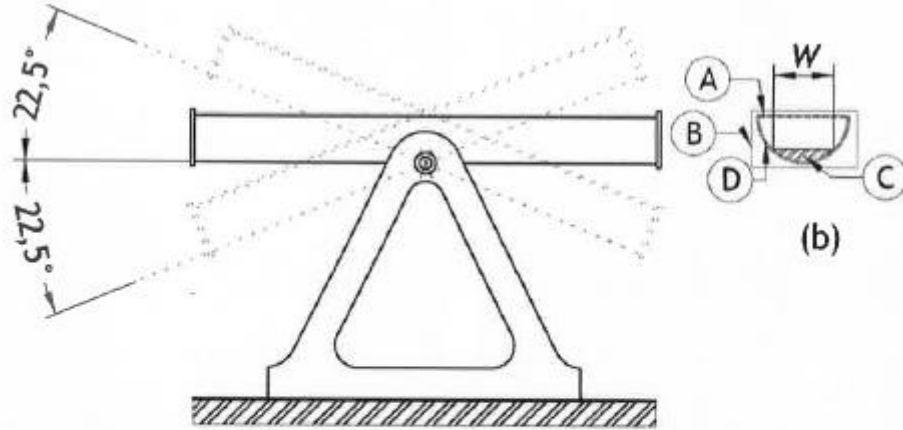
The test sample was then refilled with fresh gravel/water mixture to continue the test a further number of cycles to achieve a total of 200.000 cycles. After every 50.000 cycles the test sample was cleaned, dried and measured.

Ambient temperature was $22 (\pm 5) ^\circ\text{C}$ during test period.

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(a)

Key

- A cover
- B end sealing cap
- C water and abrasive
- D test piece

- (a) general arrangement
- (b) section through test piece
- W width of water surface

Fig.2 Test arrangement

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3.) Test Results

Table 1 below shows the measured values for all the measuring intervals.

Distance from end (mm)	Abrasion after 50.000 cycles (mm)	Abrasion after 100.000 cycles (mm)	Abrasion after 150.000 cycles (mm)	Abrasion after 200.000 cycles (mm)
150	0.039	0.173	0.283	0.417
170	0.050	0.198	0.317	0.403
190	0.146	0.255	0.361	0.489
210	0.114	0.230	0.328	0.451
230	0.134	0.253	0.354	0.471
250	0.080	0.224	0.365	0.471
270	0.066	0.189	0.293	0.427
290	0.045	0.195	0.341	0.450
310	0.105	0.216	0.329	0.449
330	0.097	0.225	0.333	0.457
350	0.084	0.191	0.317	0.447
370	0.089	0.216	0.338	0.470
390	0.118	0.221	0.335	0.482
410	0.081	0.198	0.327	0.482
430	0.080	0.201	0.323	0.452
450	0.080	0.218	0.361	0.481
470	0.086	0.198	0.338	0.484
490	0.084	0.205	0.339	0.455
510	0.110	0.211	0.345	0.457
530	0.056	0.168	0.291	0.447
550	0.091	0.213	0.304	0.449
570	0.061	0.180	0.245	0.411
590	0.152	0.265	0.290	0.427
610	0.071	0.181	0.271	0.420
630	0.067	0.186	0.294	0.419
650	0.104	0.221	0.315	0.391
670	0.082	0.200	0.313	0.378
690	0.064	0.174	0.270	0.364
710	0.105	0.199	0.286	0.370
730	0.013	0.145	0.285	0.397
750	0.074	0.198	0.255	0.324
770	0.034	0.153	0.254	0.327
790	0.053	0.168	0.215	0.326
810	0.002	0.123	0.234	0.308
830	0.041	0.164	0.217	0.280
850	0.024	0.139	0.241	0.300
Average abrasion	0.077	0.197	0.303	0.418

Table 1 - Measured abrasion after 50-,100-,150- and 200 000 cycles

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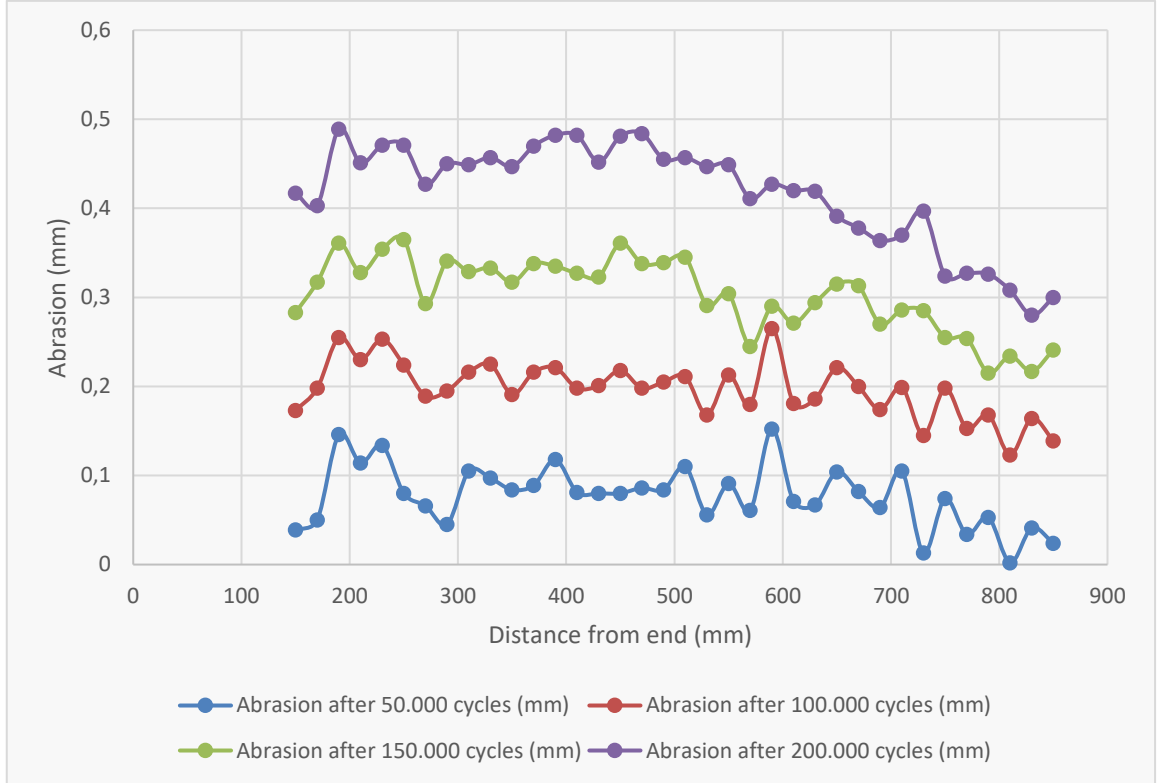


Fig.3 - Measured abrasion after 50-,100-,150- and 200 000 cycles

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Inspection Details / Muayene Detayları:

Participants/Katılanlar:		
No	Names/Adlar	Company-Organization/Şirket-Organizasyon
1	Cumhur Cihat KILIÇ	SUBOR
2	Ayşegül ALKAN	TÜV SÜD

Activity No Aktivite No	Results and comments related to inspections Muayene sonuçları ve görüşler	Note Not
	- The average abrasion loss of the pipe tested according to PD CEN/TR 15729 is given in Table 1.	

Use the applicable items of the below section / Aşağıdaki kısımda uygun maddeleri kullanın

Result of Inspection:

Muayene Sonucu



accepted / kabul



rejected / red



accepted with comments / yorumlarla birlikte kabul



fully / tamamen



partially / kısmen

Status of Items (acc. to P.O.):

Durum (siparişe göre)



complete / tamam



not complete / tamam değil



released for export packing



ready for shipment

ihracat paketlemesi için serbest

nakliye için hazır

Purchase Order Status:

Sipariş Emrinin Durumu



complete /tamam



not complete / tamam değil

Further Inspections:

Sonraki Muayeneler



yes, probably on:

evet, muhtemelen



no / hayır

Attachments / Ekler:

- Calibration certificate for meter
- Calibration certificate for comparator
- Calibration certificate for thermometer (ambient temperature gauge)

Associated Documents / İlgili Dökümanlar:

- PD CEN/TR 15729:2010

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Photographs / Fotoğraflar

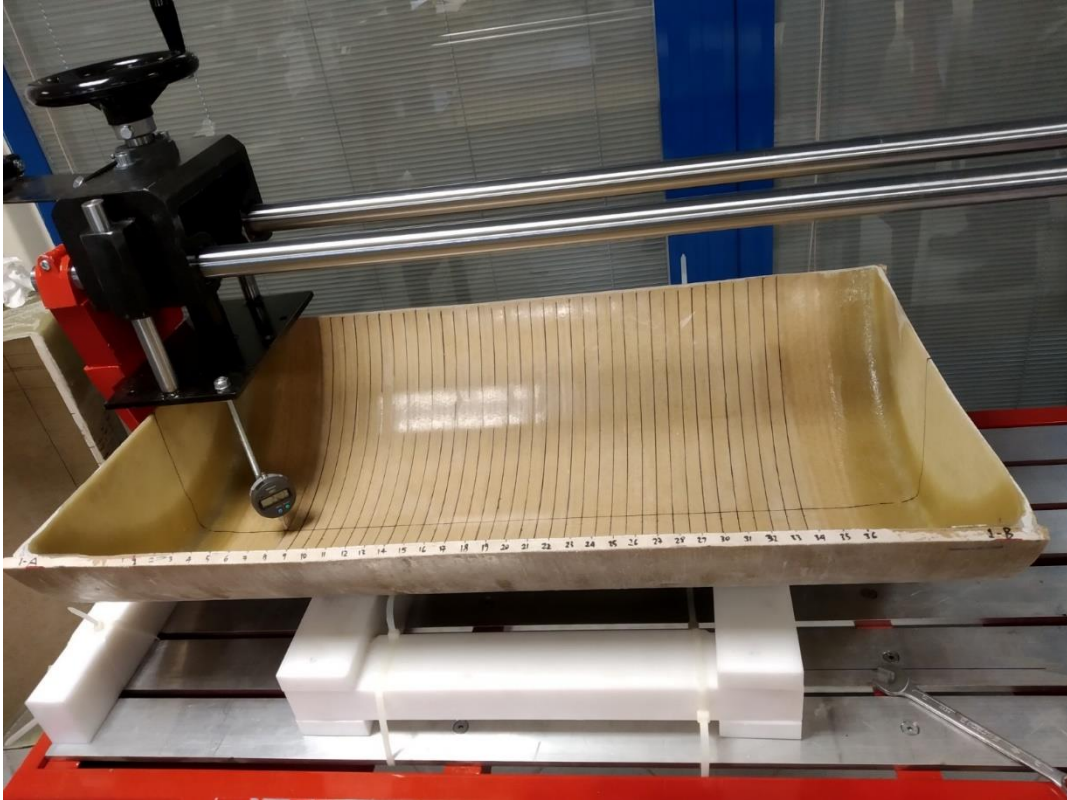


Photo 1 – Measuring

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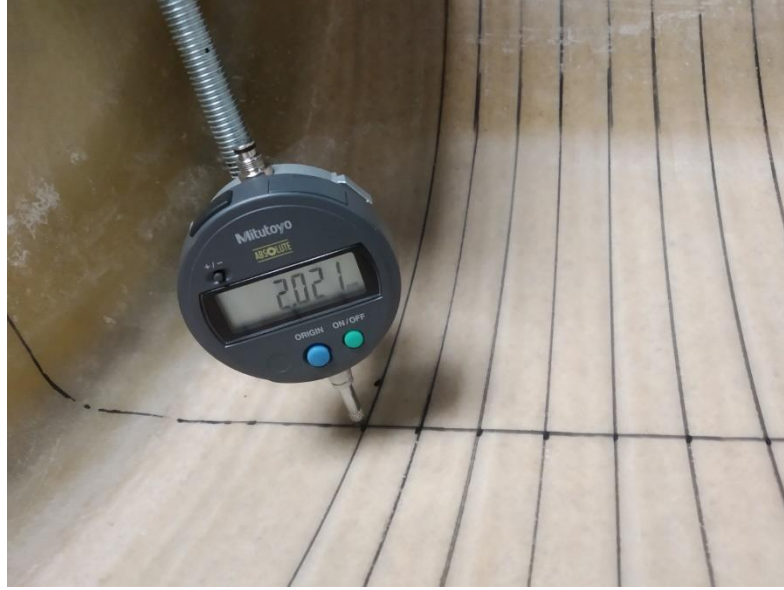


Photo 2 – Measuring



Photo 3 – Test sample filled with gravel/water mixture

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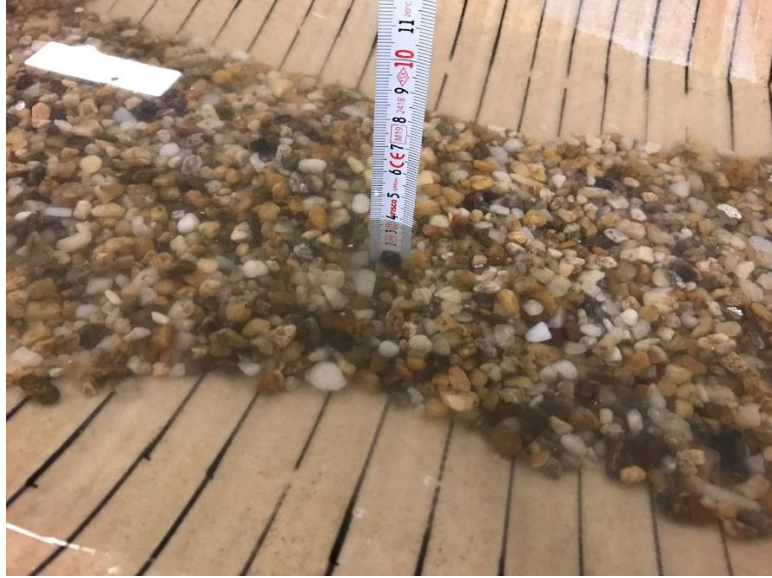


Photo 4 – Test sample filled with gravel/water mixture



Photo 5 – Test sample installed in the tilting frame

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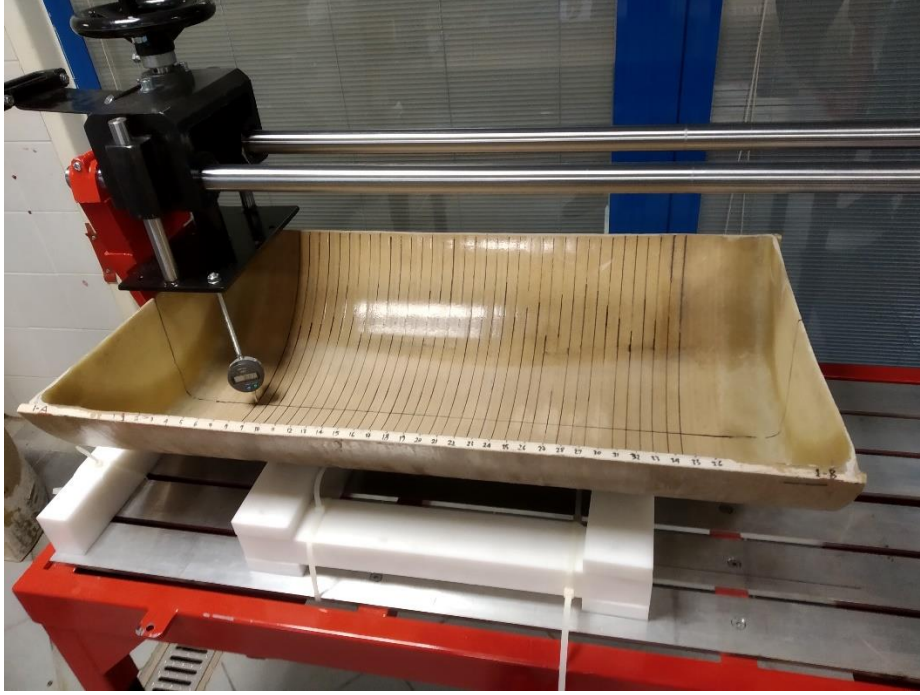


Photo 6 – Final Measurements

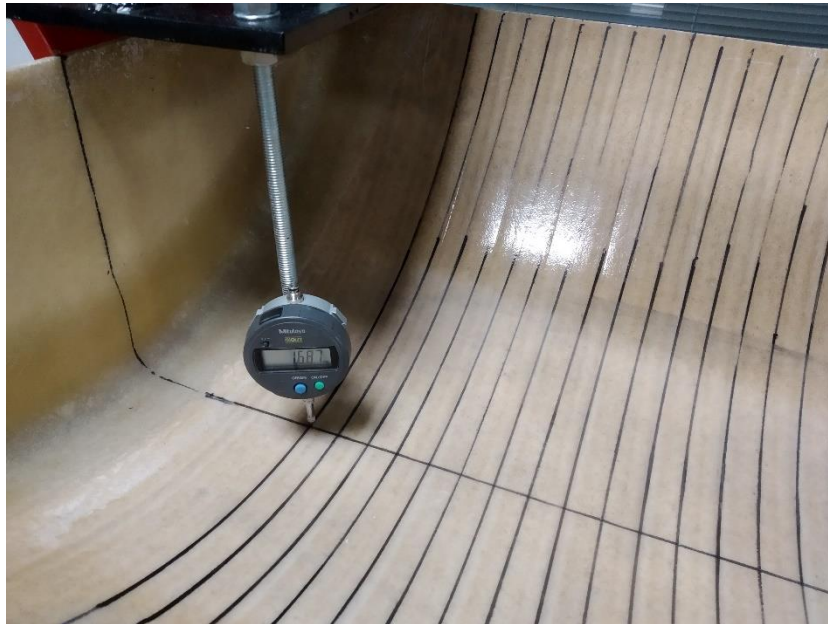


Photo 7 – Final Measurements

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ÖLÇÜM KALİBRASYON VE MÜHENDİSLİK HİZMETLERİ METROLOGY CALIBRATION AND ENGINEERING

KALİBRASYON SERTİFİKASI CALIBRATION CERTIFICATE

AB-0163-K	
11999	
03-10	

Cihazın sahibi / Customer: 1 SUBOR BORU SANAYİ VE TİCARET A. Ş.
Ahmetler Mahallesi Karapazarcık/SAKARYA

İstek numarası / Order no: 2 1073

Makine/Cihaz / Instrument/Device: 3 ŞERİT METRE

İmalatçı / Manufacturer: 4 FISCO

Tip / Type: 5 2

Seri Numarası / Serial Number: 6 ----

Kalibrasyon Tarihi / Date of Calibration: 7 15.03.2019 **Cihaz Kodu** / Device No: 8 1053

Sertifika Sayfa Sayısı / Number of pages of the Certificate: 9 2

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeleir.
This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren Testkal Ölçüm Kalibrasyon ve Mühendislik Hizmetleri, TÜRKAK'tan AB-0163-K dosya numarasıyla TS EN ISO/IEC 17025:2012 standardına göre akredite edilmiştir.
Testkal Ölçüm Kalibrasyon ve Mühendislik Hizmetleri accredited by TÜRKAK under registration number AB-0163-K file for TS EN ISO/IEC 17025:2012 as Calibration Laboratory.

Türk Akreditasyon Kurumu (TÜRKAK) kalibrasyon sertifikalarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma antlaşmasını imzalamıştır.
The Turkish Accreditation Agency (TÜRKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation (EA) and of the International Laboratory Accreditation (ILAC) for the Mutual Recognition of Calibration Certificates.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metodları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmektedir.
The measurement results, the uncertainty with confidence probability and calibration methods are given on the following pages which are part of this certificate.

 Kapan / Seal	Tarih / Date 16.03.2019	Kalibrasyonu yapan / Calibrated by OKAY PÖYRAZ	Onaylayan / Approval ERSİN GÖKÇE
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Bu sertifika, TESTKAL laboratuvarının yazılı izni olmaksızın kopyalanamaz, çoğaltılamaz. İzinsiz olarak başka sertifikalar geçersizdir.
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BİRİMİ: PİRİ CARI MAH. SAKARYA CAD. NO: 33/301 ADAPAZAR/SAKARYA

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Tel: +90 (384) 301 89 80
E: 200751@testkal.com

Photo 8 – Calibration certificate for meter



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	BİLGİNÖĞLÜ ENDÜSTRİ MALZEMELERİ SAN. VE TİC. A.Ş. Kamelye C.5.0.72 Sokak No:11 Üsküdar - Beşiktaş / İstanbul Tel: 0090 212 177 19 09 Fax: 0090 212 27 27 09		
Kalibrasyon Sertifikası Calibration Certificate		AB-0189-K 19-0006 12.18	
Çiğner Sahibi / adresi : Customer / address	SÜBOR BORU SAN. VE TİC. A.Ş. AHMETLER MAH. ŞEHİT MUSTAFA GEYVE CAD. NO:15 KARAPÜRÇEK / SAKARYA		
İstek Numarası : Order No.	757951		
Makine/Çihaz : Instrument/Device	ANALOG KOMPARATÖR SAATI		
İmalatçı : Manufacturer	M/TU/TOYO		
Tip : Type	20505		
Seri Numarası : Serial Number	A00589		
Kalibrasyon Tarihi : Date of Calibration	24.12.2019		
Sertifika Sayfa Sayısı : Number of pages of the Certificate	3		
<p>Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri esas alarak ölçüm standartlarına idare edilmiş bir ölçüme göre hazırlanmıştır. This calibration certificate documents the traceability to national standards, which make the use of measurement according to the International System of Units (SI).</p> <p>Kalibrasyon laboratuvarı olarak faaliyet gösteren BİLGİNÖĞLÜ ENDÜSTRİYİ MALZEMELERİ SAN. VE TİC. A.Ş., TÜRKAKK ile AB-0189-K ve TS EN ISO/IEC 17025:2017 uluslararası gözetiminde çalışmaktadır. AB-0189-K accredited by TÜRKAKK under registration number AB-0189-K ev TS EN ISO/IEC 17025:2017 as Calibration Laboratory</p> <p>Türk Akreditasyon Kurumu (TÜRKAKK) kalibrasyon sertifikalarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma anlaşması imzalamıştır. Turkish Accreditation Agency (TÜRKAKK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of calibration certificates. Çapraz tanımlama, gelişmiş ölçüm birimlilikleri ve kalibrasyon metodları bu sertifikadaki kalibrasyonların aynı ölçüm biriminde yapılmasıdır. The measurement, uncertainty, confidence probability and calibration methods are given on the following pages which are part of this certificate.</p>			
Mühür Seal	Tarih Date	Kalibrasyonu Yapan Calibrated by	Deneyimci Approved by
	24.12.2019	Dijital olarak imzalayan ÇAĞDAŞ KIRINCA	Dijital olarak imzalayan SERAP SÖP
24.12.2019			

Photo 9 – Calibration certificate for comparator

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ÖLÇÜM KALİBRASYON VE MÜHENDİSLİK HİZMETLERİ METROLOGY CALIBRATION AND ENGINEERING

KALİBRASYON SERTİFİKASI CALIBRATION CERTIFICATE

AB-0163-K
14284
07-19

Cihazın sahibi Customer	SUBOR BORU SANAYİ VE TİCARET A. Ş. Ahmetler Mahallesi Karapürçek/SAKARYA
İstek numarası Order no.	1073
Makine/Cihaz Instrument/Device	DIGITAL TERMOKİLOMETRE
İmalatçı Manufacturer	----
Tip Type	----
Seri Numarası Serial Number	----
Kalibrasyon Tarihi Date of Calibration	16.07.2019
Sertifika Sayfa Sayısı Number of pages of the Certificate	2
	Cihaz Kodu Device No 883

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.
This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren Testkal Ölçüm Kalibrasyon ve Mühendislik Hizmetleri, TÜRKAK'tan AB-0163-K dosya numarası ile TS EN ISO/IEC 17025:2017 standardına standardına göre akredite edilmiştir.
Testkal Ölçüm Kalibrasyon ve Mühendislik Hizmetleri accredited by TÜRKAK under registration number AB-0163-K file no. TS EN ISO/IEC 17025:2017 as Calibration Laboratory.

Türk Akreditasyon Kurumu (TÜRKAK) kalibrasyon sertifikalarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma anlaşmasını imzalamıştır.
The Turkish Accreditation Agency (TÜRKAK) is signatory to the mutual recognition agreements of the European co-operation for the Accreditation (EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognition of calibration certificates.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metodları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmektedir.
The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

 Kape Seal	Tarih Date 17.07.2019	Kalibrasyonu yapan Calibrated by ERHAN KARADUMAN	Onaylayan Approved ERSİN GÖKÇE
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Bu sertifika, TESTKAL laboratuvarı yazılı izni olmadan hiçbir şekilde çoğaltılamaz. İzinsiz olarak üretilen sertifikalar geçersizdir.
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ADRES: YERİ ÇAMIR MAH. SAKARYA CAD. NO: 30/101 ADAKAZARI/SAKARYA TEL: +90 264 201 99 66 E-POSTA: info@testkal.com

Photo 10 – Calibration certificate for thermometer (ambient temperature gauge)

Place, Date / Yer, Tarih
Sakarya / 13.02.2020

Inspector to TÜV SÜD / TÜV SÜD Denetçisi
Ayşegül Alkan



TGK IS 306