

RS-105 & RRS-15

Cable & Pipe Penetration Sealing System



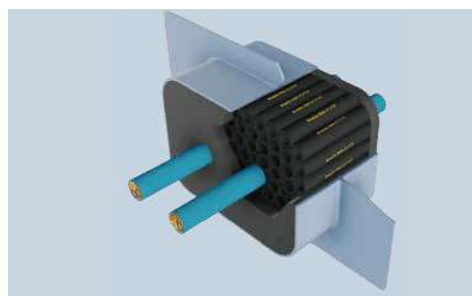
Features

- Fire rating: A-0(without insulation), A-60 & H-120 class
- Excellent intumescences and heat absorption
- High elasticity and high tensile strength
- High bonding strength
- Gas-tight: 0.5 bar
- Water-tight: 2.5bar
- UV light and ozone resistance
- Variety of sizes, which conform to all wiring standards
- No negative changes in repelling cold and heat



Applications

- Fire-retardant sealing for cables
- Fire-retardant sealing for steel, SUS, PVC, PP-R, copper pipes
- Water and gas proof sealing for electronic and wiring elements



Specifications

- Color: dark gray
- Total drying time: 120 hours [20mm]
- Surface drying time: 1 to 2 hours
- Storage life: 12 months
- Service life: more than 50 years
- Service temperature: -55 °C to 180 °C
- Specific gravity: about[1.12±0.03] g/cm³
- Tensile strength: 8.15kgf/cm³ [= 0.80 Mpa]
- Tensile failure: 80%
- Hardness: 40 shore A
- Elasticity: 25%
- Storage temperature: room temperature
- UV test: grade 5, [40±1] °C, 24 hours
- Cold shock: no crack, [-55±1] °C, 3 minutes



Products



Dimensional Data of RRS-15 [A&H class]

RRS-15 is a special rubber compound which is fire-resistant, intumescent and endothermic.

When RRS-15 is exposed to temperatures over 180℃, it expands up to 20 times its original volume.

Carbonized mass is produced in the process which creates excellent thermal insulation ability.

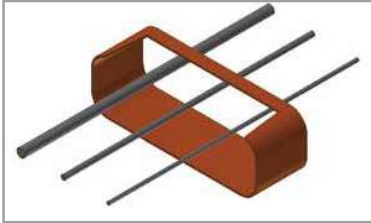
RRS-15 M 18/12 and M 27/19 can be supplied in nonsplit multi-units of 10 pieces bonded together.

Type	Cable Diameter (mm)	Length (mm)		Wall Thickness (mm)
		A-class	H-class	
12/6	5-7	140/160	210	3
14/8	7-9			3
16/10	9-11			3
18/12	11-13			3
20/14	13-15			3
22/16	15-17			3
27/19	17-21			4
31/23	21-25			4
35/27	25-29			4
39/31	29-33			4
46/36	33-39			5
52/42	39-45			5
58/48	45-51			5
64/54	51-57			5
70/60	57-63			5
M18/12	multi-type			3
M27/19	multi-type			3

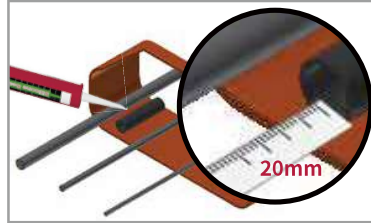
Certificate Status

Class	Classification Party	Description	Certificate No.
H-120	DNV	Cable Penetration Sealing System	TAF0000068
H-120	BV	Cable & Pipe Penetration Sealing System	21455/A0 BV
H-120	LR	Pipe Penetration Sealing System	SASF150017
H-60	DNV	Pipe Penetration Sealing System	SASF150017
H-60	LR	Cable Penetration Sealing System	SASF140337
A-60	DNV	Cable Penetration Sealing System	F-20134
A-60	BV	Cable Penetration Sealing System	18994/B1 EC
A-60	ABS	Cable Penetration Sealing System	08-BK327768
A-60	ABS	Cable Penetration Sealing System	14-BK327768
A-60	KR	Cable Penetration Sealing System	CWN19193-FP002
A-60	MED	Pipe Penetration Sealing System	32430/A0 EC
A-60	LR	Cable Penetration Sealing System	SAS F120218
A-60	NK	Cable Penetration Sealing System	TA141076E[R]
A-60	DNV	Pipe Penetration Sealing System	F-20267
A-60	RS	Cable & Pipe Penetration Sealing System	12.00050.294
A-0	BV	Pipe Penetration Sealing System	43857/A0 EC
A-0	DNV	Cable Penetration Sealing System	TAF00000FU
B-0	ABS	Pipe Penetration Sealing System	13-BKT1056123-PDA

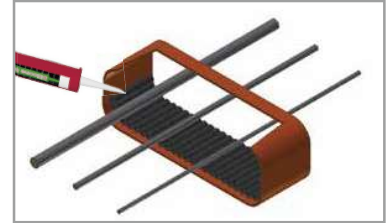
Installation Procedures [Bulkhead Type]



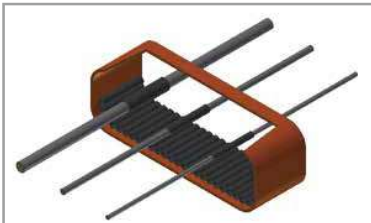
- 1 Calculate the amount of sealant & sleeve necessary after aligning cables in work area.



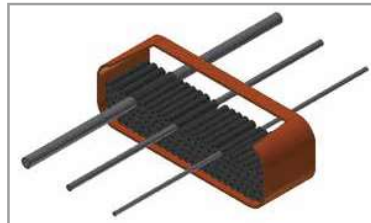
- 2 Attach a RRS-15 to inside of the coaming for basis to set other sleeves with 20mm depth using RS-105 sealant and ruler.



- 3 After applying a little RS-105 sealant to each surface of RRS-15 sleeves, attach RRS-15 sleeves to inside of the coaming in a line on the basis of previous a RRS-15.



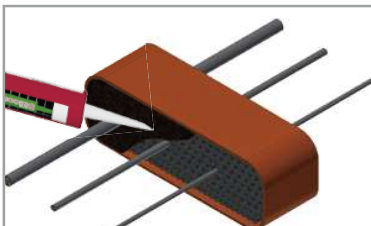
- 4 Wrap the cables with suitable RRS-15 sleeves in accordance with cable sizes.



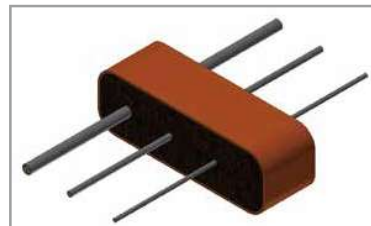
- 5 Fill empty space with RRS-15 sleeves & fillers to the full in the coaming.



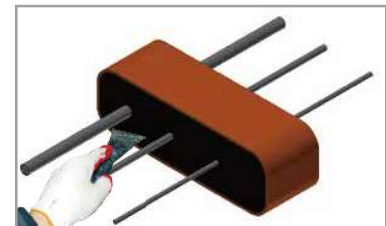
- 6 Push the surface of RRS-15 edges using a hand for checking denseness.



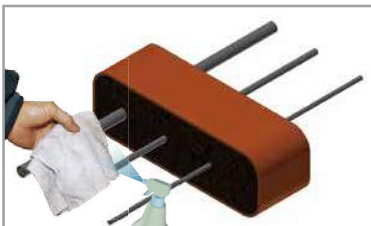
- 7 Spread sealant RS-105 to both side of the coaming.



- 8 Seal tightly at coaming with RS-105.



- 9 Trim sufficient RS-105 on exposed surface at the end of the coaming using device like as a kind of spatula or scraper.



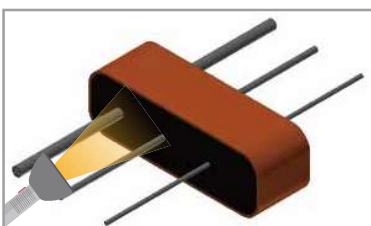
- 10 Spray water on a piece of soft cloth.



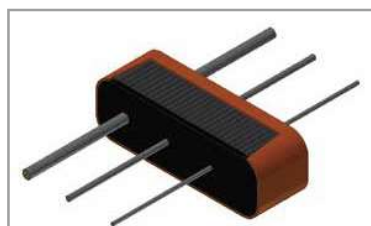
- 11 Smooth the surface of RS-105 evenly with a wet soft cloth.



- 12 Check the hardening condition of RS-105 with a hand.



- 13 Check surface condition with a light.

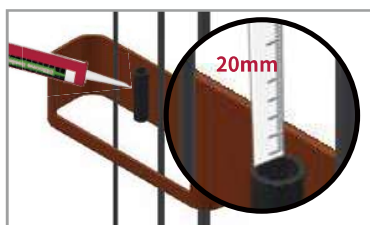


- 14 complete.

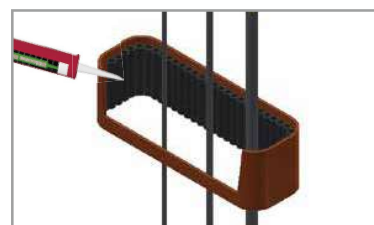
Installation Procedures [Deck Type]



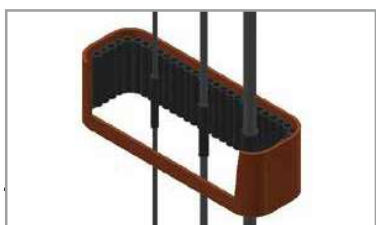
- 1 Calculate the amount of sealant & sleeve necessary after aligning cables in work area.



- 2 Attach a RRS-15 to inside of the coaming for basis to set other sleeves with 20mm depth using RS-105 sealant and ruler.



- 3 After applying a little RS-105 sealant to each surface of RRS-15 sleeves, attach RRS-15 sleeves to inside of the coaming in a line on the basis of previous a RRS-15.



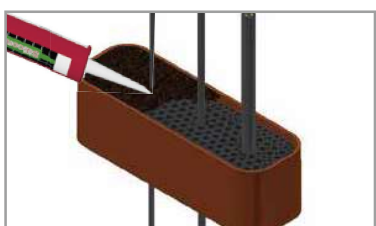
- 4 Wrap the cables with suitable RRS-15 sleeves in accordance with cable sizes.



- 5 Fill empty space with RRS-15 sleeves & fillers to the full in the coaming.



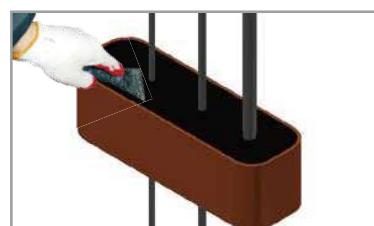
- 6 Push the surface of RRS-15 edges using a hand for checking denseness.



- 7 Spread sealant RS-105 to both side of the coaming.



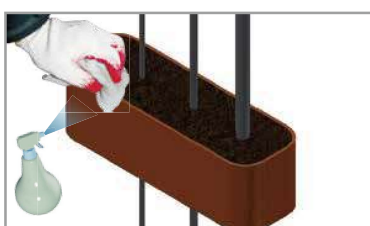
- 8 Seal tightly at coaming with RS-105.



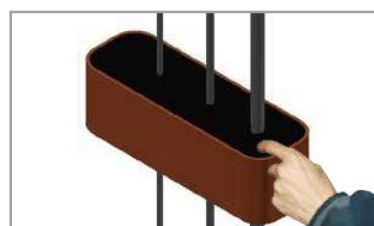
- 9 Trim sufficient RS-105 on exposed surface at the end of the coaming using device like as a kind of spatula or scraper.



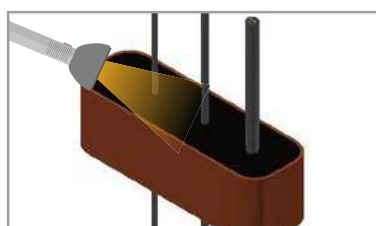
- 10 Spray water on a piece of soft cloth.



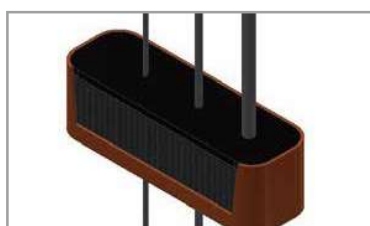
- 11 Smooth the surface of RS-105 evenly with a wet soft cloth.



- 12 Check the hardening condition of RS-105 with a hand.

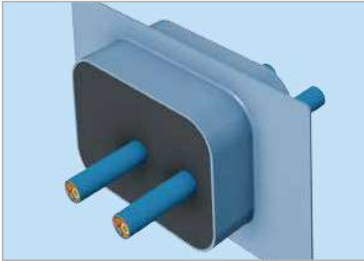


- 13 Check surface condition with a light.



- 14 complete.

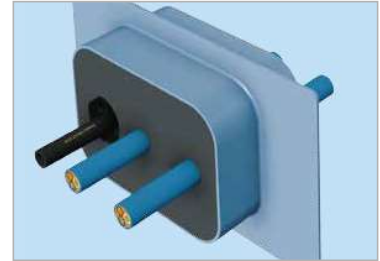
Repair Work Processes



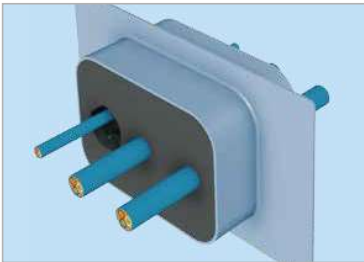
- ① Coaming that needs to be repaired.



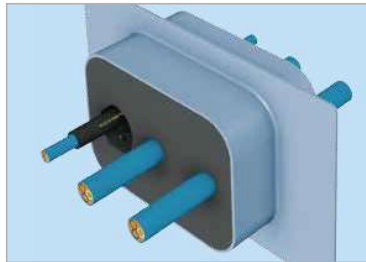
- ② Remove RS-105 Sealant where to be modified with a cutting tool like as a knife.



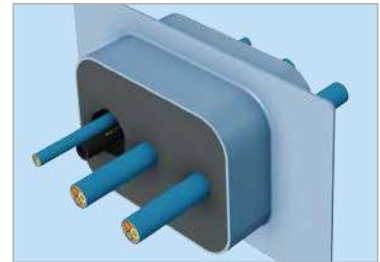
- ③ Remove RRS-15 Sleeve.



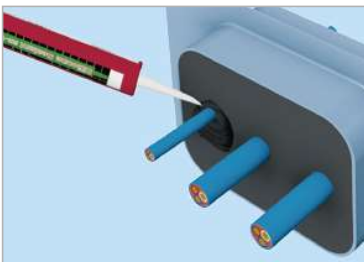
- ④ Replace with new cables or pipes.



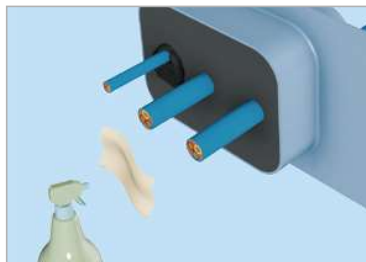
- ⑤ Wrap modified cables or pipes with RRS-15 Sleeves.



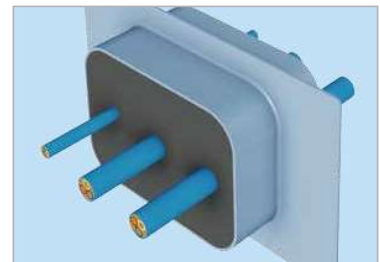
- ⑥ Fill in the removed part with RRS-15 Sleeves.



- ⑦ Apply RS-105 Sealant with a sealant gun and level the surface.



- ⑧ Spray water on a piece of soft cloth and scrub the surface of RS-105 Sealant evenly with the wet cloth.



- ⑨ Completed.

Comparative Temperature Test between RRS-15 and Other Product

Deformation Temperature Test on Sleeves



45 °C



55 °C



45 °C



Other product was deformed at 70 °C



Rushing RRS-15 with a finger at 70 °C



RRS-15 was completely restored to the original form [no deformation].

Deformation Temperature Test on Sleeves



Frozen RRS-15 was deformed with strong impacts.



Frozen RRS-15 was restored with a hammer.



Frozen RRS-15 was restored to the original from.



Other product was broken and couldn't be restored.



Comparison between RRS-15 and other product after fracture test.



Image of Fire Test [H class]

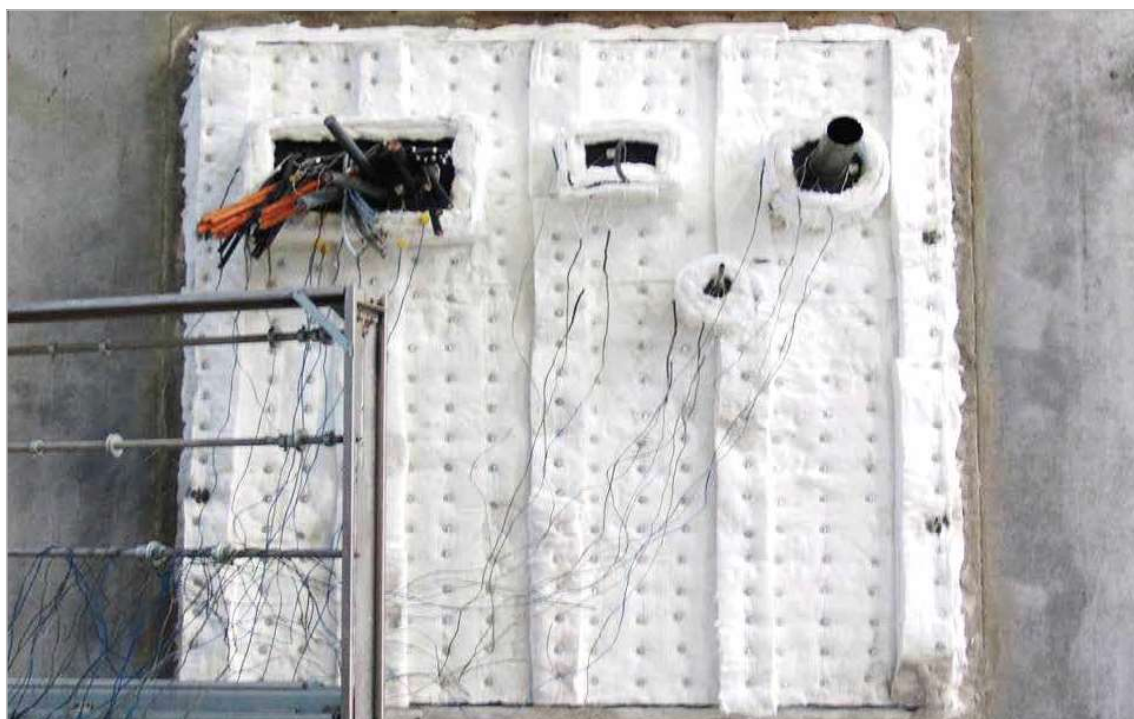
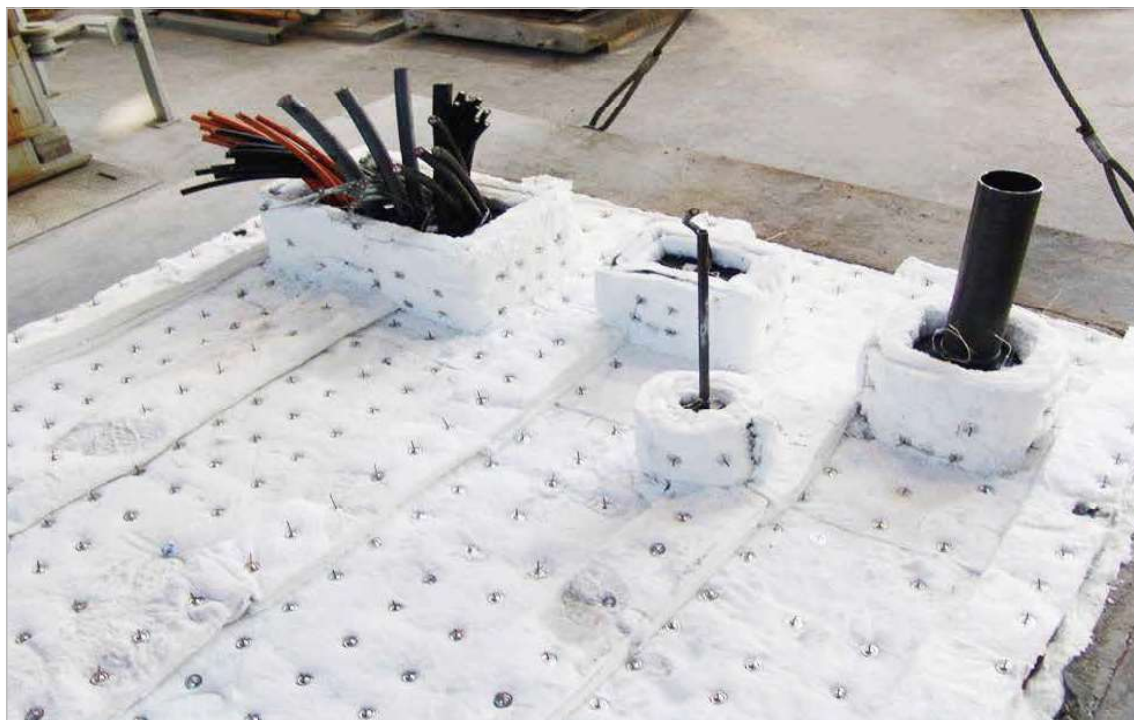


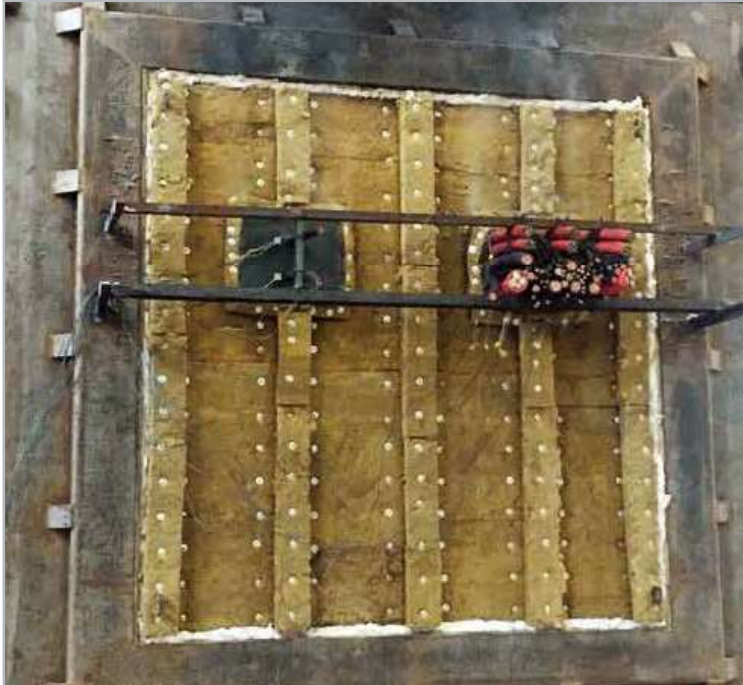
Image of Fire Test [H-120 class]



Image of Fire Test [A-60 class]



Image of Fire Test [A-60 class]



90mm cable

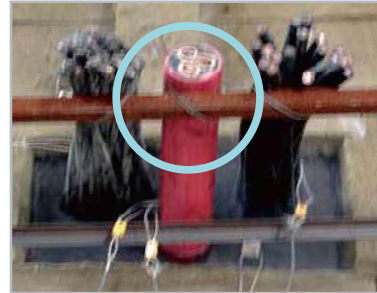


Image of Fire Test [A-0 class]

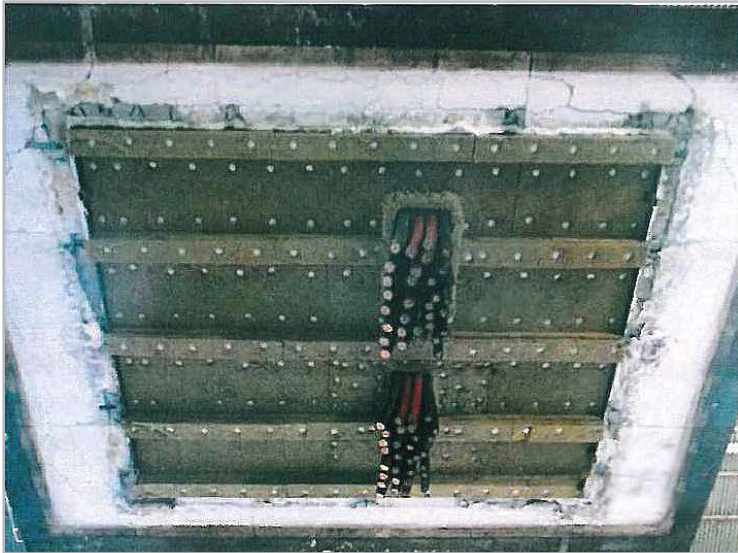


Minimum pipe coaming



Image of Fire Test [A-60 class]

before



after



Cable Penetration Gas and Water Tightness Test Report

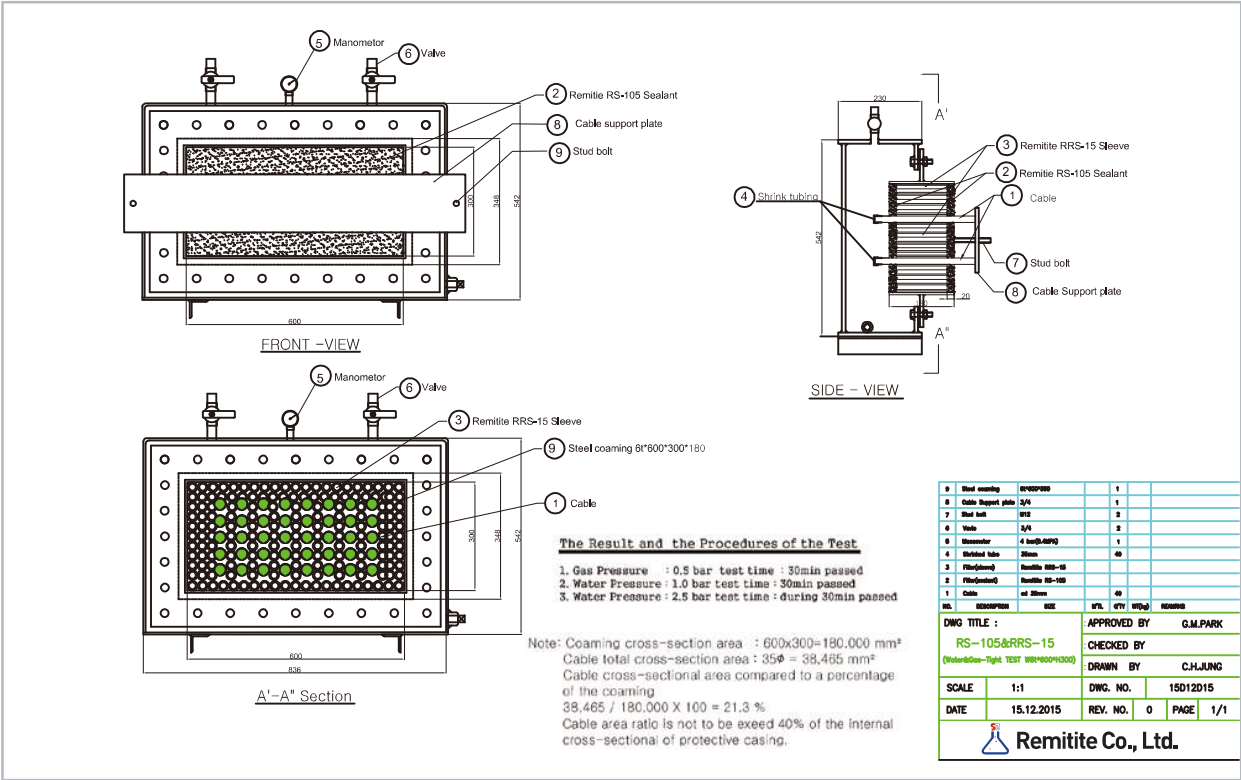
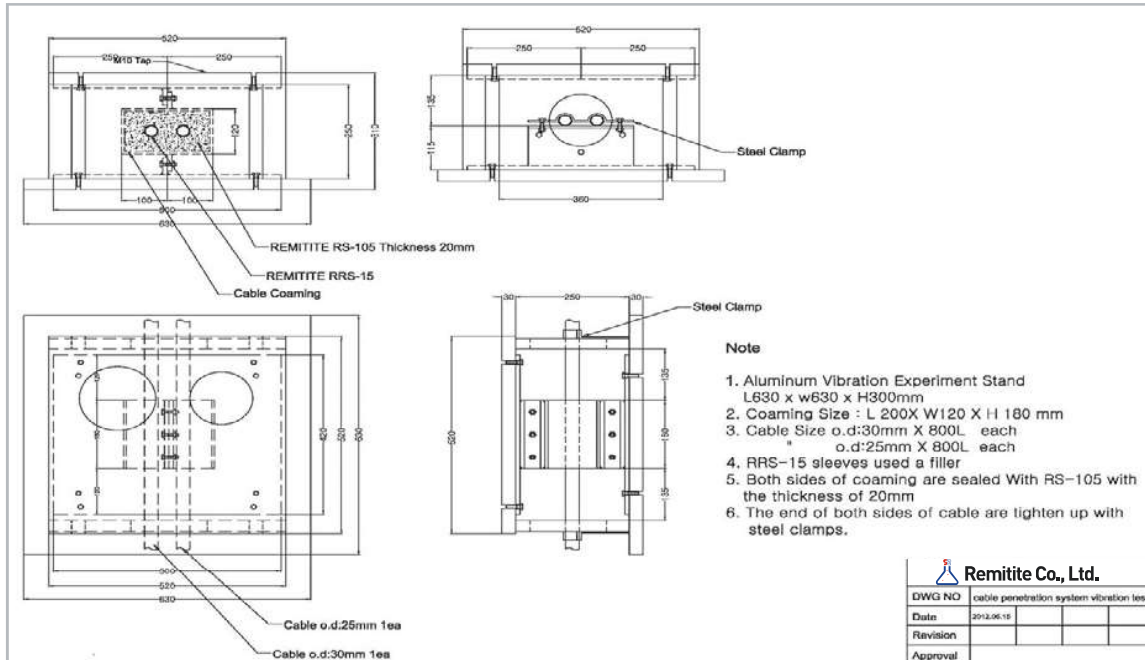


Image of Cable Penetration Gas and Water Tightness Test



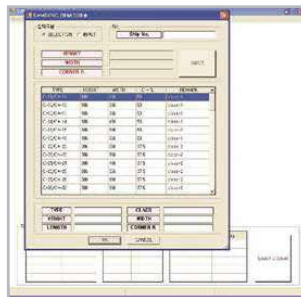
Cable Penetration Vibration Test Report



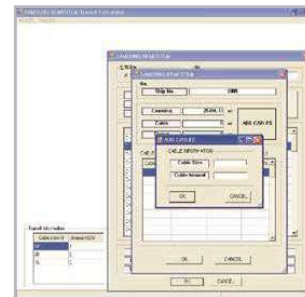
Transit Calculator for Cable & Pipe Penetration System



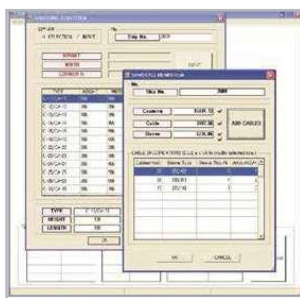
1. Click "Work" - "New".



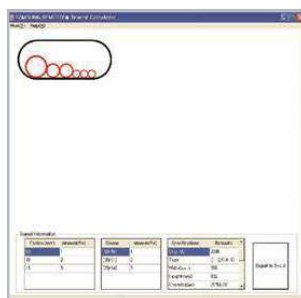
2. Insert ship No. and confirm size of coaming.



3. Insert the cable number and its external diameter.



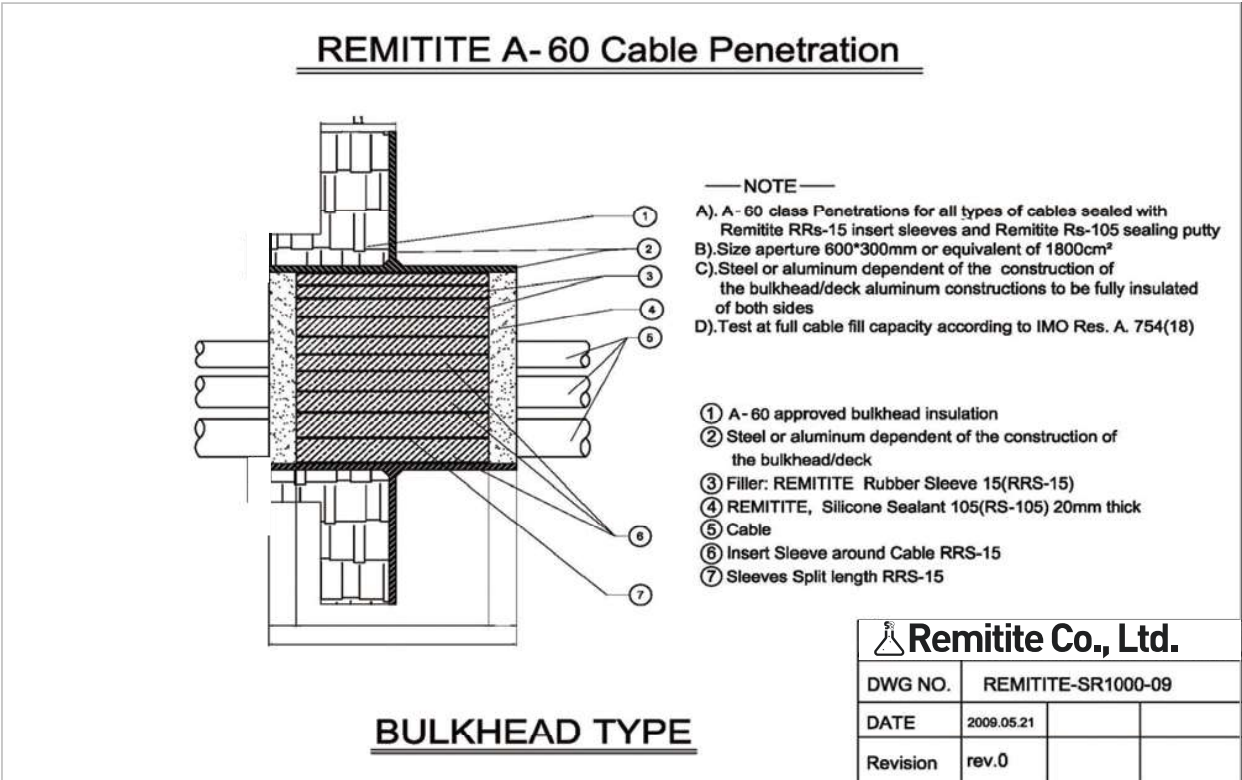
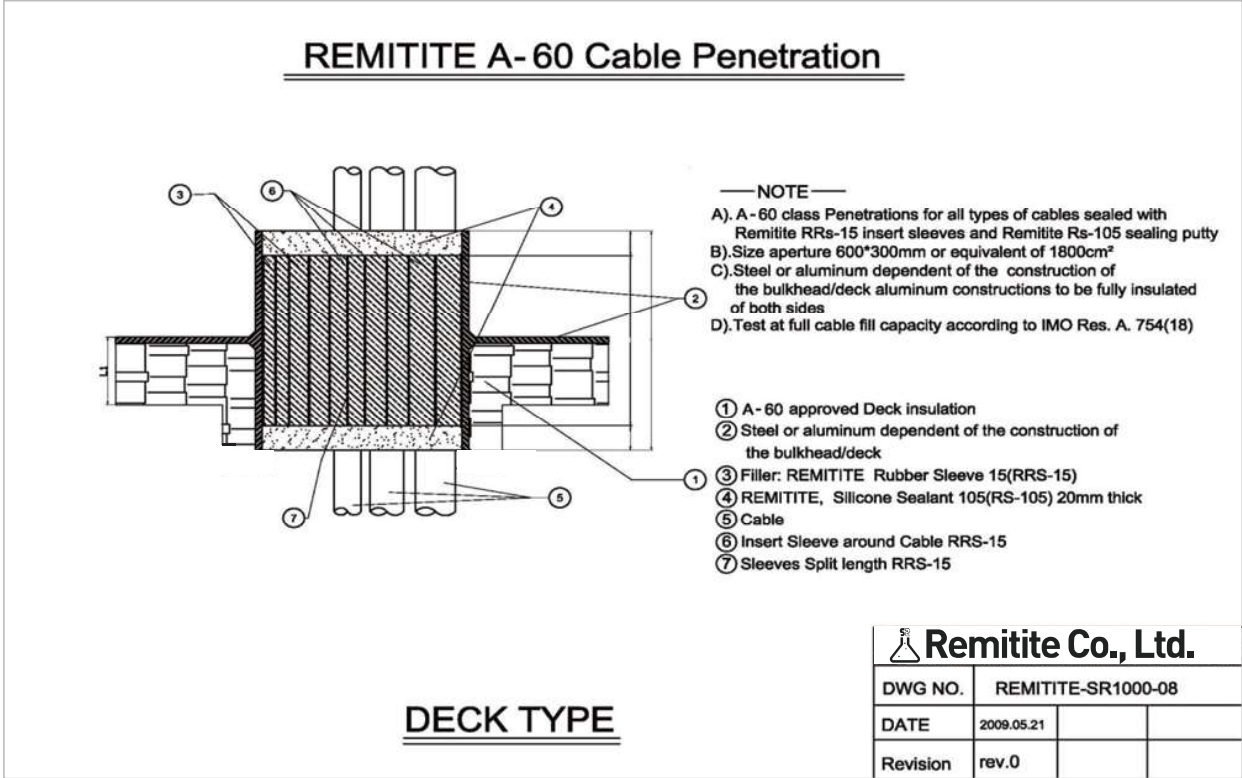
4. Click "Export to Excel" and "Output".



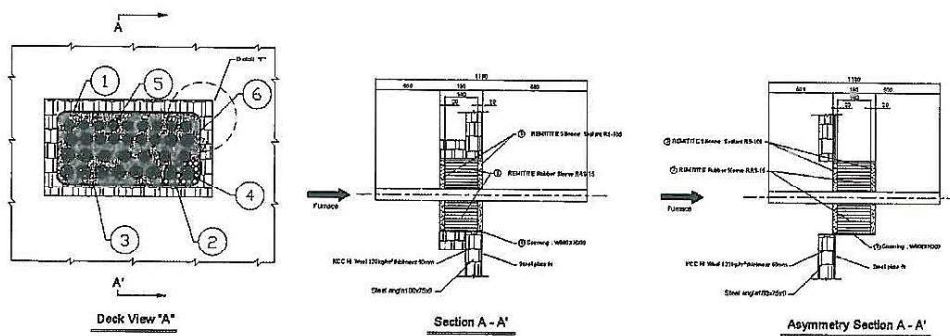
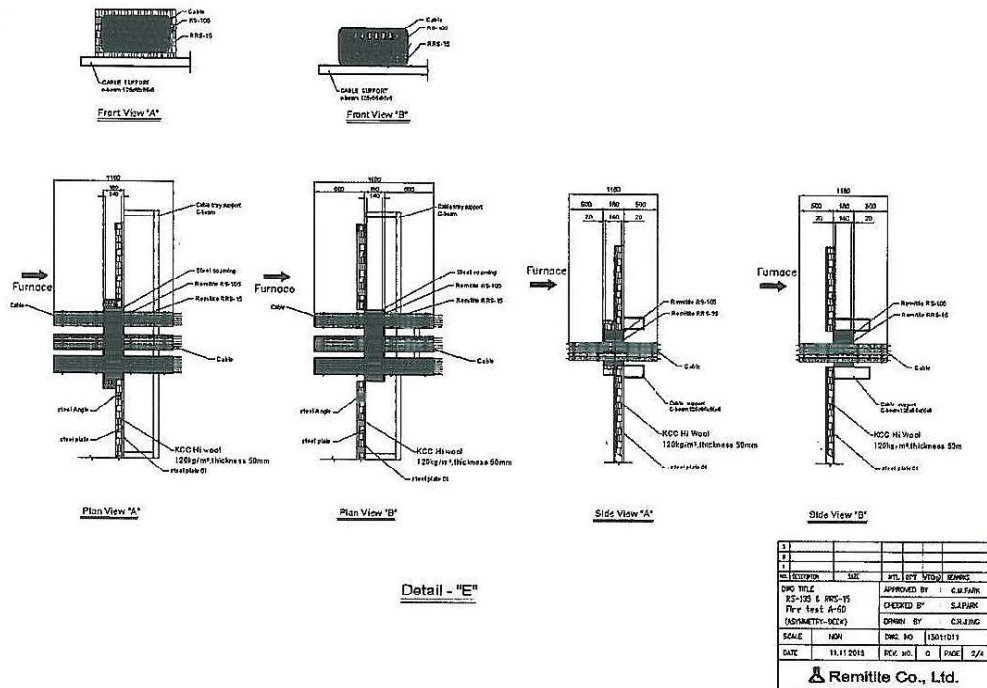
5. Check input status and confirm.

Possible to calculate and estimate with in house developed program.

A-60 Test Report for Deck and Bulkhead Type

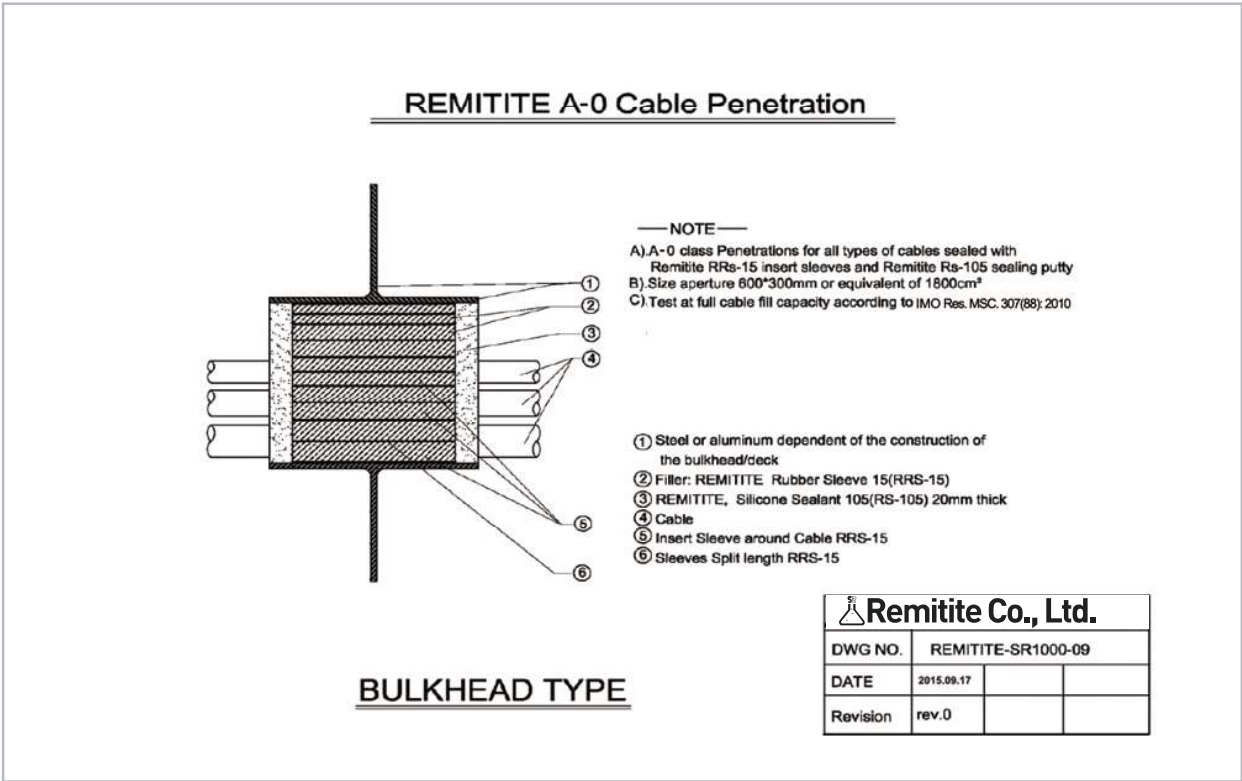
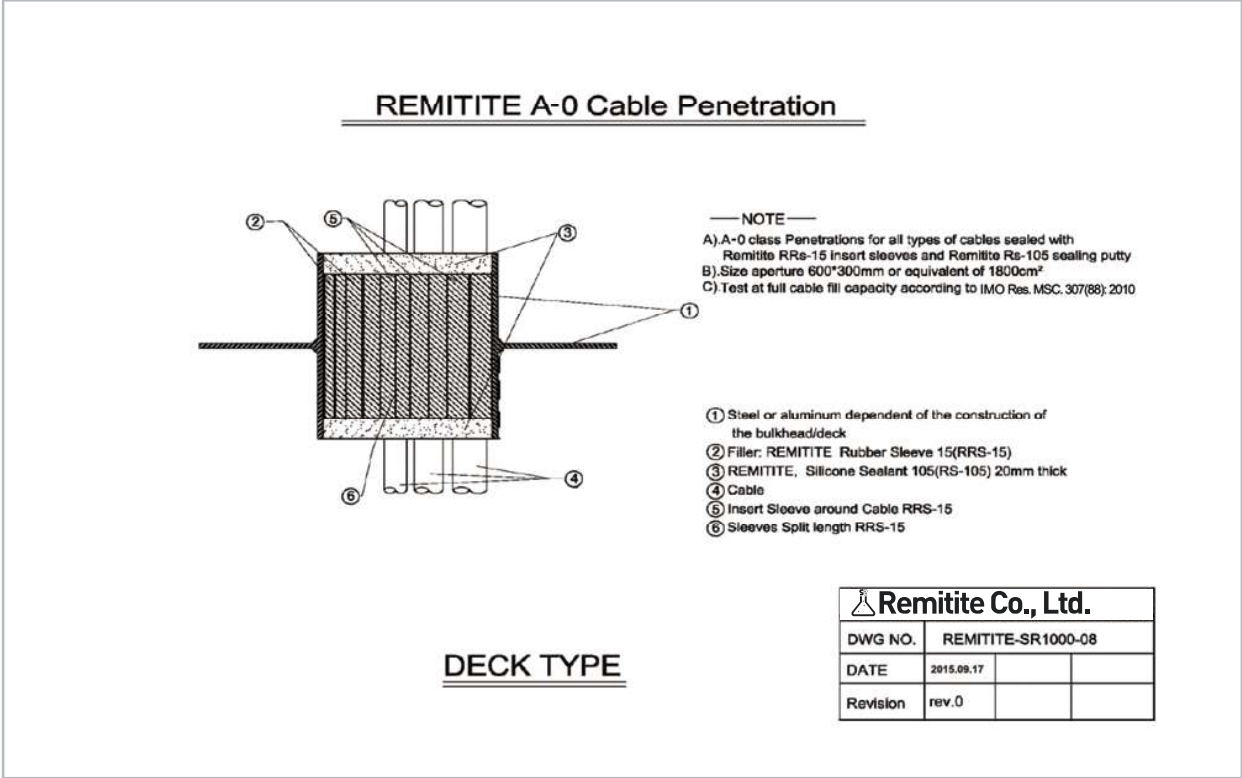


A-60 Test Report for Deck Type[Non-symmetry]



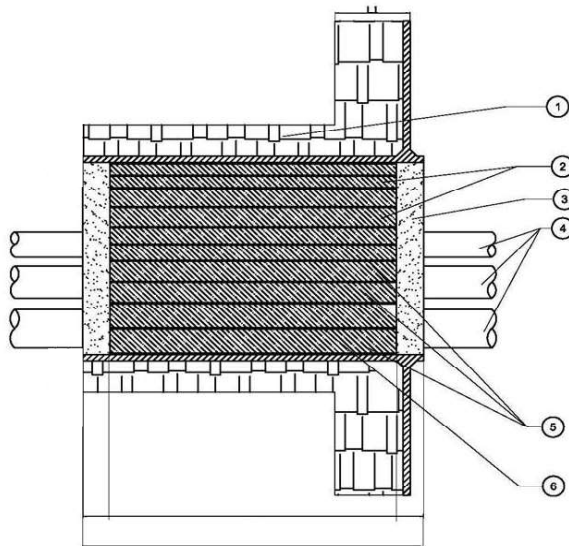
Note:
Maximum cable cross-section of large coating
Coating cross-section area : 600x300=177.82mm²
Cable total cross-section area : 69.49mm² x 2
69.49/177.82x100=39.1% x 2

A-0 Test Report for Deck and Bulkhead Type



H-120 Test Report for Bulkhead and Non-symmetry Type

Remitite H-120 Cable Penetration



— NOTE —

- A). H-120 class Penetrations for all types of cables sealed with Remitite RRs-15 insert sleeves and Remitite Rs-105 sealing putty
 B). Size aperture 600*300mm or equivalent of 1800cm²
 C). Test at full cable fill capacity according to IMO Res. A. 754(18)

- ① H-120 approved bulkhead insulation
 ② Filler: REMITITE Rubber Sleeve 15(RRS-15)
 ③ REMITITE, Silicone Sealant 105(RS-105) 20mm thick
 ④ Cable
 ⑤ Insert Sleeve around Cable RRS-15
 ⑥ Sleeves Split length RRS-15

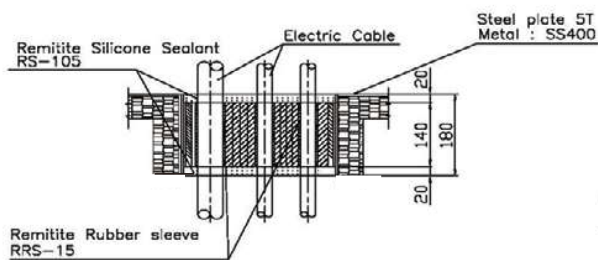
BULKHEAD TYPE

Remitite Co., Ltd.

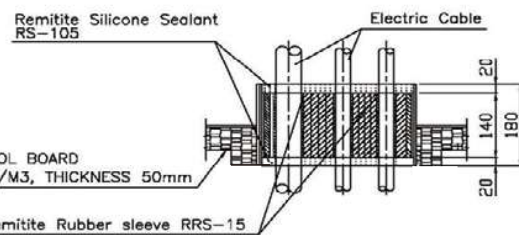
DWG NO. REMITITE-H120-BH-1005

DATE 2009.05.21

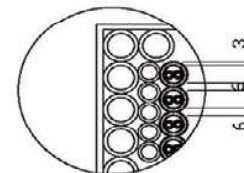
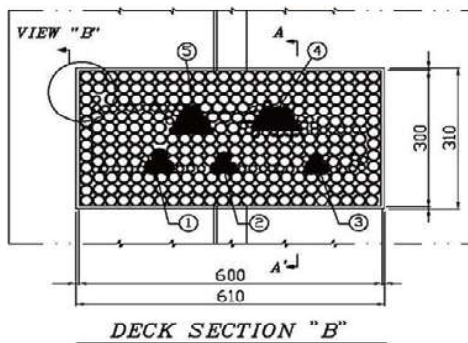
Revision rev.0



VIEW A-A'



CERTIFIED FOR
NON-SYMMETRY



VIEW "B"

TOTAL	34		
5	250V TTYCV-S 0.755x20 (TMC)	10	16
4	0.6/1kV TTYC 1.55x35 (TMC)	15	12
3	0.6/1kV TTYC 30x25 SD (JS)	3	24
2	250V MPYCS 1.50x37 (KUKDONG)	3	29
1	0.6/1kV TTYCV 30x50 SD (JS)	3	35
NO.	Cable Type	QTY	Diameter Sheath

Remitite Co., Ltd.

DWG NO. REMITITE-TCOA60-11-3

DATE 2011. 10. 10

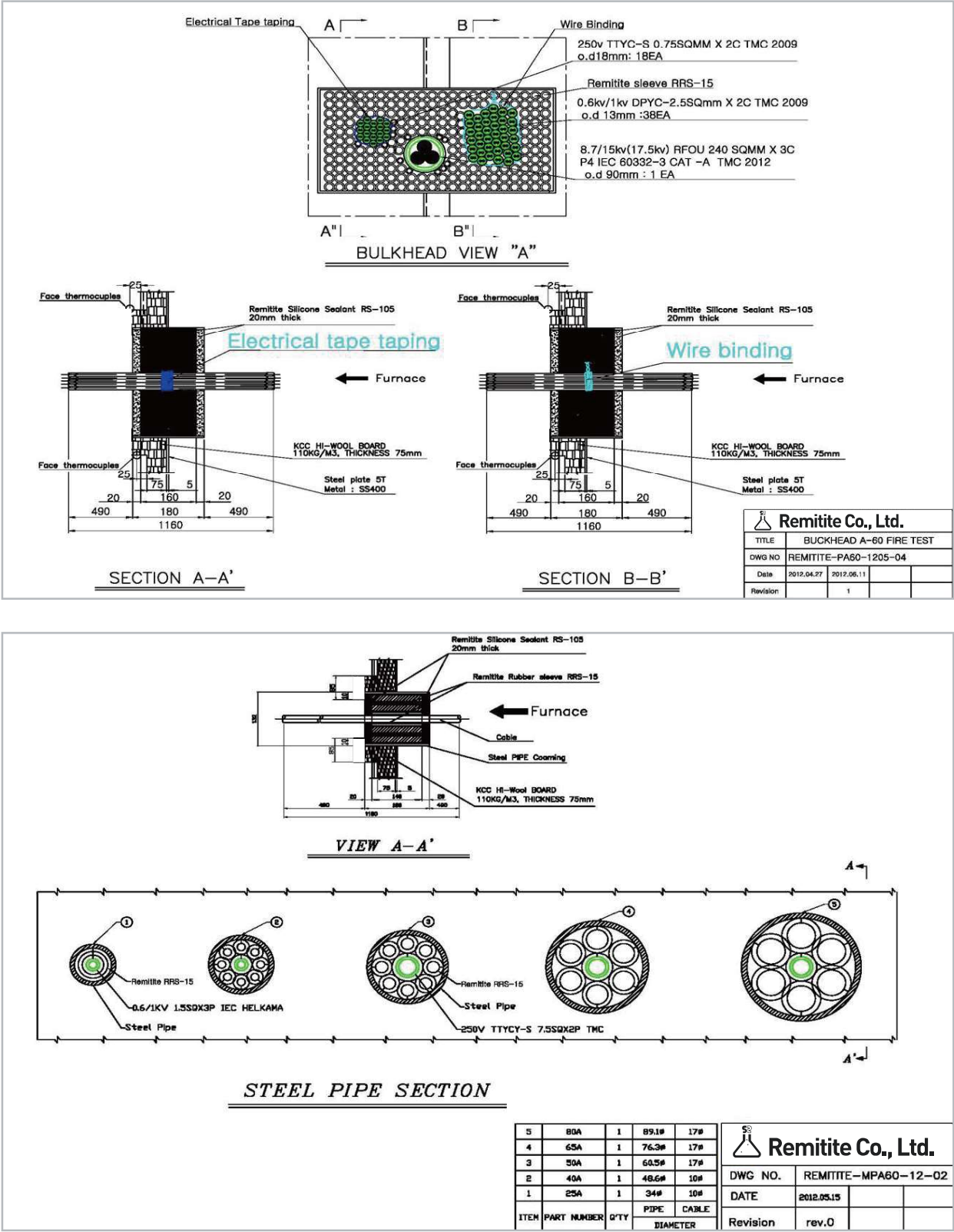
Revision rev.0

Cable & Pipe Penetration Sealing System RS-105 & RRS-15

www.remitite.com

39

Test Report for Tape, Wire and Steel Pipe



Test Report for Tape, Wire and Steel Pipe

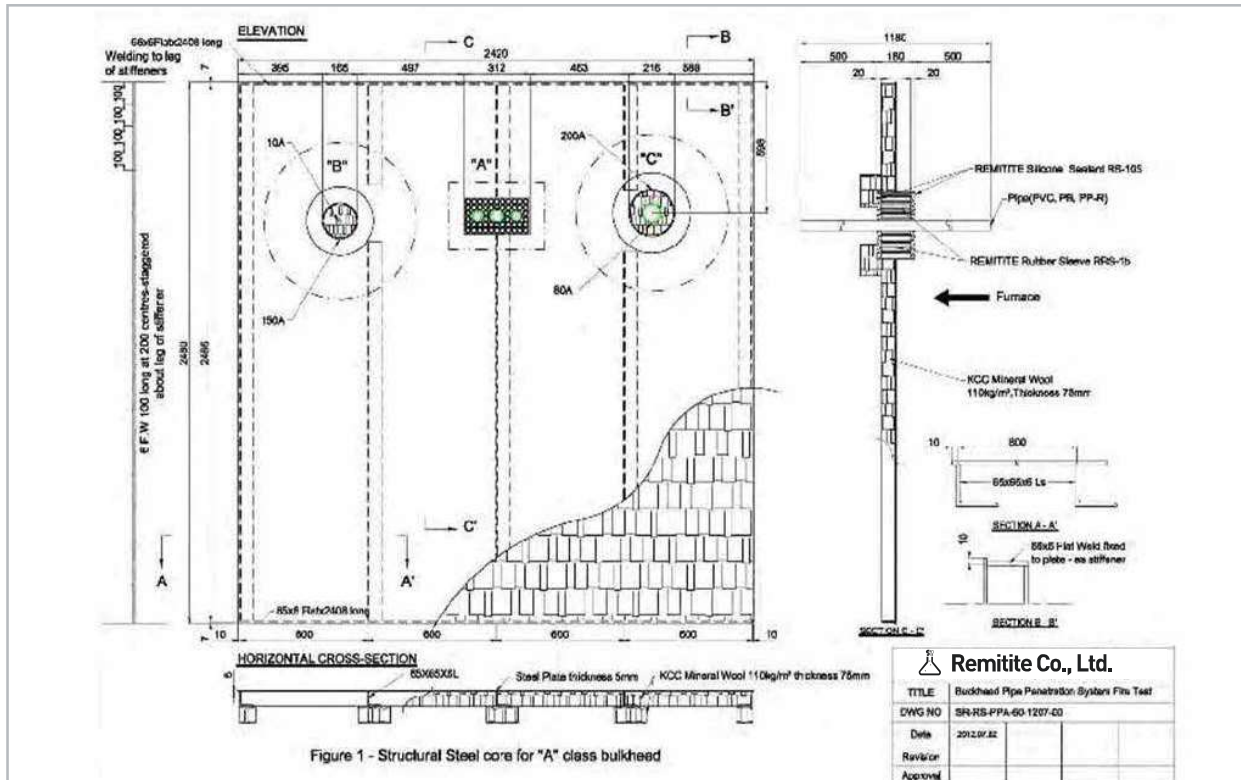


Figure 1 - Structural Steel core for "A" class bulkhead

Cable & Pipe Penetration Sealing System RS-105 & RRS-15

www.remitite.com

41

Certificates

DNV-GL
Certificate No: YAF0000066

TYPE APPROVAL CERTIFICATE

This is to certify:
That the Class H Penetration
with type designation(s)
RRS-15 / RS-105 cable
Issued to:
Remitite Co., Ltd.
Kyungnam Korea, Republic of Korea
Is found to comply with
DNV GL offshore standards.

Application:
Approved for use as cable penetration system in class H-120 bulkheads.
See Applications/Limitations on page 2.

This Certificate is valid until **2020-12-31**.
Issued at **Havik** on **2018-01-12**
DNV GL local station: **Gimhae HC & FIS**
Approval Engineer: **Ragnar Tenjer**

for DNV GL
Petter Langnes
Head of Section

This Certificate is subject to terms and conditions specified. Any significant change in design or construction may render this Certificate invalid. The validity also relates to the Type Approval Certificate and not to the approval of equipment/construction installed.

Form code: TA 1411a Revision: 2017-05 www.dnv-gl.com Page 1 of 1

Page 1 / 3

BUREAU VERITAS
Marine & Offshore
Division

Certificate number: 21455B0 BV
File number: ADI 4000572
Product code: S300H
This certificate is not valid unless presented with the full attached schedule composed of 7 sections
www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to:
REMITITE CO., LTD.
Gimhae (Gyeongsangnam) - KOREA (REPUBLIC OF)

for the type of product
PIPE, CABLE, DUCT PENETRATIONS IN FIRE DIVISIONS
H-120 cable transit for bulkhead penetration - Type Remitite silicon sealant 105 & Remitite rubber sleeve 15

Requirements:
PI C, Ch 4 of BV Rules for the Classification of Offshore Units.
PI C, Ch 4 of BV Rules for the Classification of Steel Ships.
Regulation MSC 81(87) FTP Code, Annex 1, Part 3 with IMO MSC.307(88) (2010 FTP Code) article 8
Regulation A.754(18) with HC fire temperature curve.
IMO MSC/Circ. 1203

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: **20 Aug 2020**

For BUREAU VERITAS,
At BV PUSAN, on 20 Aug 2015,
Heon Gook Choi

This certificate remains valid until the date stated above, unless cancelled or revised, provided the conditions indicated in the subsequent pages are complied with and the product remains unchanged in service. This certificate set (as well as the equivalent release any changes or modifications to the approved product, which have not been notified to, and agreed in writing by BUREAU VERITAS. Should the certified equipment or standards be superseded during the validity of the certificate, the product(s) must be approved prior to being placed into service without a written approval of BUREAU VERITAS. The certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any person not a party to the certified product to which this document is delivered may not expect a sign against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, such as in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristar.com/veristar/bv/viewPublicPDFtype.asp?docname/750341>
BV Mod. Ad E 330 October 2014

This certificate consists of 3 pages(s)

Lloyd's Register

CERTIFICATE OF FIRE APPROVAL

This is to certify that
The product(s) detailed below will be accepted for compliance with the applicable Lloyd's Register Rule and Regulations for use on offshore installations classed with Lloyd's Register, and for use on offshore installations when authorised by contracting governments to issue the relevant certificate, license, permits etc.

Manufacturer Remitite Co. Ltd.
Address 36-12 Yongdok-ro
Halla-eup
Gimhae-si
Gyeongsangnam-do 621-872
Republic of Korea

Type H-60 FIRE PENETRATION (HYDROCARBON FIRE TEST)
Description Single Pipe Circular Penetration - Type "REMITITE SILICONE SEALANT 105" and "REMITITE RUBBER SLEEVE 15" penetration in steel bulkheads
Specified Standard IMO Res. A.754(18) Performance Criteria and NFO Hydrocarbon Time/Temperature Curve

The attached Design Approval Document forms part of this certificate.
This certificate remains valid unless cancelled or revised, provided the conditions in the attached Design Approval Document are complied with and the equipment remains satisfactory in service.

Date of issue 3 August 2014 **Expiry date** 2 August 2019

Certificate No. SAS F130017 **Signed** 

Sheet No. 1 of 2 **Name** M. Farrier
Surveyor to Lloyd's Register EMEA
A Member of the Lloyd's Register Group

Note:
This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register of any modification or changes to the equipment in order to obtain a valid Certificate.

Lloyd's Register Group Limited is a limited liability company and its respective officers, employees or agents are, individually and collectively, released by this certificate as to any liability (except negligence) in respect of any and all claims for loss, damage or expense caused or suffered by the installation or service of this equipment or construction provided that the person has agreed to comply with the relevant Lloyd's Register rules for the production of the certificate and the use of the certificate is in accordance with the terms and conditions set out in that contract.

See also the design document (the design and construction details) and the relevant standards.

Form code: TA 1411a Revision: 2017-05 www.lloyd-reg.com Page 1 of 1

DNV-GL
Certificate No: YAF0000069

TYPE APPROVAL CERTIFICATE

This is to certify:
That the Class H Penetration
with type designation(s)
RRS-15 / RS-105 pipe
Issued to:
Remitite Co., Ltd.
Kyungnam Korea, Republic of Korea
Is found to comply with
DNV GL offshore standards.

Application:
Approved for use as pipe penetration system for steel pipes in class H-60 bulkheads.
See Applications/Limitations on page 2.

This Certificate is valid until **2020-12-31**.
Issued at **Havik** on **2016-01-12**
DNV GL local station: **Gimhae HC & FIS**
Approval Engineer: **Ragnar Tenjer**

for DNV GL
Petter Langnes
Head of Section

This Certificate is subject to terms and conditions specified. Any significant change in design or construction may render this Certificate invalid. The validity also relates to the Type Approval Certificate and not to the approval of equipment/construction installed.

Form code: TA 1411a Revision: 2017-05 www.dnv-gl.com Page 1 of 1

ABS

CERTIFICATE NUMBER

14-BK327768-3-PDA

DATE

28 July 2014

ABS TECHNICAL OFFICE

Busan Ship Engineering

CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of
REMITITE CO., LTD. - GIMHAE

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the back of this certificate.

PRODUCT **Cable, Transit Systems**

MODEL **Remitite Silicone Sealant #1B5,
Remitite Rubber Sleeve 15.**

This Product Design Assessment (PDA) Certificate 14-BK327768-3-PDA, dated 28Jul/2014 remains valid until 27Jul/2019 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the product.

Out of the Product or an ABS classed vessel, MODU or facility which is contained after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non-ABS classed vessels, MODUs or facilities is to be at an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING

Kosaku Sano

Engineer

ABS2014-07-28

NOTES: This certificate represents compliance with one or more of the Rules. Details, approvals or other criteria of ABS or a statutory, national or manufacturer's standards are a subset under the title of ABS. Its issuance, its terms or other authorized parties, its expiration, changes in the administrative handling procedures, approvals from ABS will exist on the surface bookkeeping and not. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-1 Terms and Conditions of the Bureau for Product Type Approval and Agreement (2012).

Page 1 / 3

MARINE DIVISION

Certificate number: 2943/00 EC

File number: ACI 4810046/001

Annex A item number: A.1/3.269

USC Module B number:

164.138 / EC0062

This certificate is not valid unless presented without the
for extended introduction component of 7 months

www.bureauveritas.com

NOTICE NUMBER 0062 - MARINE EQUIPMENT DIRECTIVE 95/96/EC

EC TYPE EXAMINATION CERTIFICATE

as per Module B of European Union Council Directive 95/96/EC on marine equipment
as amended by Commission Directive 2011/76/EU

This certificate is issued to

SAMSUNG REMITTE CO.

Gimhae (Gyeongnam) - KOREA (REPUBLIC OF)

for the type of product

PENETRATIONS THROUGH 'A' CLASS DIVISIONS: PIPE, DUCT, TRUNK, etc

PENETRATIONS

A-60 Class Pipe Penetration Sealing System for Bulkheads
- Remitite silicon sealant 105 & Remitite rubber sealer 15

- Cerak Wool #128 & Remitite silicon sealant RSI-701

Requirements:

DOLAS 16 conversion as amended, Regulations II-2/9

IMO MSC 1/Circ.1278

IMO Resolution MSC.307(ME) (F) Code Annex 1 Part 3

IMO MSC/Circ.1120

This certificate is issued under the French Maritime Authority to attest that BUREAU VERITAS did undertake the relevant type-examination procedures for the product identified above which was found to comply with the relevant requirements of the Council Directive 95/96/EC of 20 December 1992 as amended.

This certificate will expire on: **22 Mar 2018**

For BUREAU VERITAS Notified Body 0062,

At BY FUSAN, on 22 Mar 2013.

Hean Geuk Choi

This certificate does not allow to issue the Declaration of Conformity and to affix the mark of conformity (whichever ®) to the products corresponding to this type. To this end, the production-control phase of manufacturing (D, E or F) of the Directive is to be completed with and controlled by a written inspection agreement with a notified body.

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions identified in the subsequent paragraph are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, and any such changes must be notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) listed in it shall be re-approved prior to it being placed on board vessels in which the amended regulations or standards apply. BUREAU VERITAS may, at its sole discretion, refuse to extend the validity of this certificate until the expiry of the Period of Validity (POV) of this certificate. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS. Marine Division available on the internet www.marine.com. Any Person not a party to the contract is invited to verify the information may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, and/or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any specification for which it may provide.

BY Mod. A-01: 5/06 May 2008

This certificate contains 3 (pages)



NIPPON KAIJI KYOKAI

NIPPON KAIJI KYOKAI

Certificate

OF

APPROVAL

Certificate No. TA1410762(E/R)	<table border="0" style="width: 100%;"> <tr> <td style="width: 40%;">Item</td> <td>: A-60 class cable penetration</td> </tr> <tr> <td>Product name</td> <td>: Remitite silicon sealant 105 & Remitite rubber sleeve 15</td> </tr> <tr> <td>Specification</td> <td>: See Annex.</td> </tr> <tr> <td>Manufacturer</td> <td>: Remitite Co., Ltd. 164-12, Yagdook-ro, Hallim-myeon, Gimhae-si, Gyeongsangnam-do, South Korea</td> </tr> <tr> <td>Testing standard</td> <td>: IMO FTP Code Annex1 / Part 3</td> </tr> <tr> <td>Test report</td> <td>: See Annex.</td> </tr> </table>	Item	: A-60 class cable penetration	Product name	: Remitite silicon sealant 105 & Remitite rubber sleeve 15	Specification	: See Annex.	Manufacturer	: Remitite Co., Ltd. 164-12, Yagdook-ro, Hallim-myeon, Gimhae-si, Gyeongsangnam-do, South Korea	Testing standard	: IMO FTP Code Annex1 / Part 3	Test report	: See Annex.
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Testing standard	: IMO FTP Code Annex1 / Part 3												
Test report	: See Annex.												

THIS IS TO CERTIFY that the above type of product has been approved by Nippon Kaiji Kyokai with type approval No.09FPA31DA, and that the products of the above type will be accepted for use onboard ships classed with the Society as complying with the relevant requirements of the Society's *Rules for the Survey and Construction of Steel Ships* and those of the *International Convention for the Safety of Life at Sea, 1974, as amended*, subject to conditional upon the manufacturer having a quality control system audited by a competent authority to ensure continuous compliance with the type approval conditions.

This certificate is valid from 22 July 2014 until 21 July 2019.
Issued at Tokyo on 25 December 2014.

NIPPON KAIJI KYOKAI



T. Imamura
General Manager
Material and Equipment Department



Initial approval date : 22 July 2009

NOTE: The design, construction and way of installation subject to attachment. Any significant changes to the product without prior approval of NKK may be risky. Specifically, one bearing with NKK mark only.

This certificate may be renewed without retesting, provided that the test report is not more than 15 years old and that no alteration of components or construction has been made to the product.

[illegible]