

Best Choice For Industrial Insulation

**ESLIN<sup>®</sup>**

Insulation Material For

**Economy,**  
**Ecology &**  
**Energy**

**ESLIN<sup>®</sup>**  
(주)에슬린



# ESLIN<sup>®</sup>

에슬린은 에너지와 환경을 먼저 생각하는  
우리의 미래입니다.





산업용 보온 전문회사  
(주) HITLIN SP 법인 설립(2010. 02)  
E-Glass Fiber Insulation 보온재 제조, 시공, 감리전문회사  
(주)MOREENS CORPORATION 법인명 변경(2011.03)  
(주)에슬린 법인명 변경(2014. 08)

Company specialized in manufacture of industrial insulation  
"HITLIN SP Co., Ltd." established on Feb. 2010  
Company dedicated to manufacture, installation, inspection & audit related to E-glass fiber insulation material  
Company name changed to MOREENS CORPORATION on Mar. 2011  
Company name changed to ESLIN CORPORATION on Aug. 2014

제품명(Brand name): **ESLIN 에슬린**  
Ecological Energy Saving Layered Insulation(친환경 고효율 보온재)

지적 재산권 출원 현황 (2011)  
유리 장섬유 단열재 제조 장치 외 16건  
벤처 기업 지정 (2011.03.31)  
기업부설연구소 인정 (2012.04.17)  
중소기업청-기술혁신형 중소기업(INNO-BIZ)인증 취득 (2015.04)  
품질경영시스템(KIC): ISO9001 : 2009 (2011.05.02)  
환경경영시스템(KIC) : ISO14001 : 2004 (2011.05.02)  
ESLIN DNV MED-B-9971 외 ABS, LR, KR 해양선급 13건 취득 (2013.07.12)  
환경표지인증(2013.05.02)  
HB 친환경 건축자재 인증 2건 취득 (2015.08.26)  
현대중공업 공동기술개발 체결 HI HULL INSULATION 개발 (2013.04.05)  
제2회 대구-경북 창조경제대축전 "금상" 수상 (2015.11.27)

Patens as of Nov. 2011  
16patents pending including Manufacturing equipment for insulation materila using E-glass fiber  
Certified Venture Company on Mar. 31, 2011  
Authorized ESLIN R&D center of ESLIN CORPORATION on Apr. 17, 2012  
Certified INNO-BIZ on Apr. 28, 2015  
Certified Quality Management System (KIC): ISO9001:2009 on May 2, 2011  
Certified Environmental Management System(KIC):ISO14001:2004 on May 2, 2011  
13 certificate except ESLIN DNV MED-B-9971 (DNV, ABS, KR CLASS) on July. 12, 2013  
Certified Eco-Lable on May 2, 2013  
2 certificate of environmental Building Material on Aug. 26, 2015  
HI HULL INSULATION development, with Hyundai Heavy Industries &  
Construction on Apr. 05, 2013  
The 2nd Daegu-Gyeongbuk creative economy big festival "Gold prize" premier on Nov. 27, 2015

## Certificates 인증서





# Thermal Conductivity 열전도율

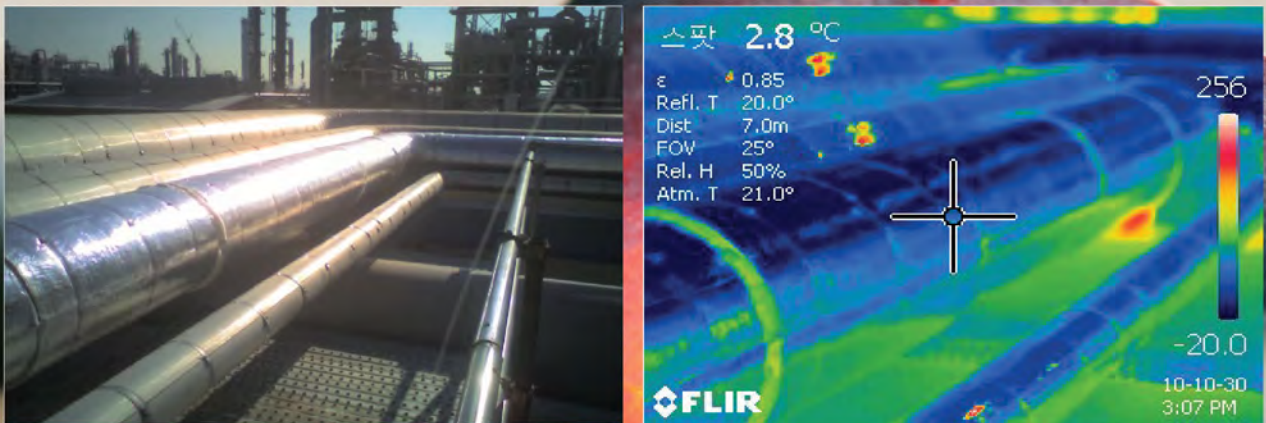
The most important of insulation is thermal conductivity.

**ESLIN** provides significantly better thermal performance than commonly used industrial insulation products. Graph as below shows thermal conductivity values for E-Glass Fiber Pipe Insulation and other pipe insulations at the same temperature.

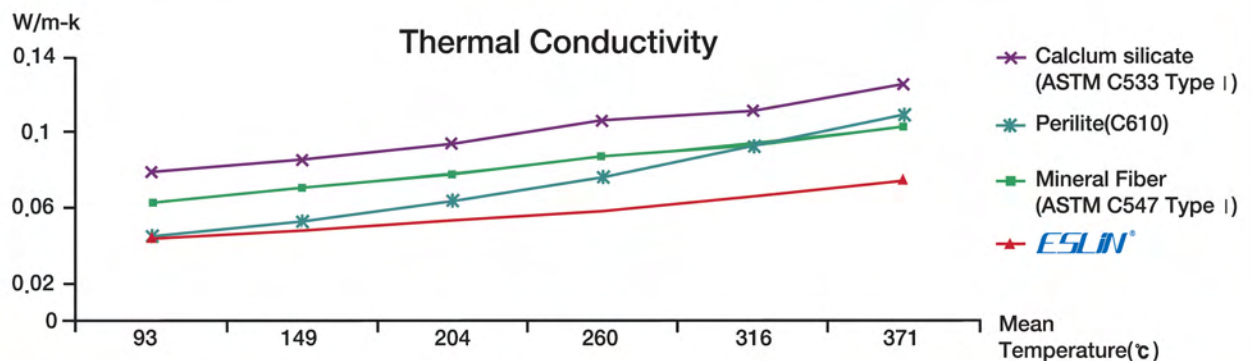
보온재에 있어 가장 중요한 점은 열전도율입니다.

**ESLIN** 보온재는 E-Glass Fiber의 우수한 단열성과, 다공성구조로 내열성 향상 및 대류에 의한 열전달 효과감소로 낮은 열전도율을 가지고 있습니다.

공기층 및 다공성입자/재료의 단열성에 의한 열손실 최소화



Thermal Conductivity 열전도율 비교





Properties of  
**ESLIN®**  
제품물성

**Material : ESLIN (E-Glass Fiber Continuous Filament)**

| Description                                      | Test Code                   | Standard                                                                                                         |
|--------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------|
| Thermal Conductivity                             | ASTM C 518<br>KS L ISO 8301 | Less than<br>0.038 Kcal/m <sup>2</sup> °C at 70°C                                                                |
| Density                                          | ASTM C 303                  | Pipe, Elbow 200 kg/m <sup>3</sup> ± 10%<br>Board 180 kg/m <sup>3</sup> ± 10%<br>Felt 160 kg/m <sup>3</sup> ± 10% |
| Linear Shrinkage                                 | ASTM C 356                  | Below 2 %                                                                                                        |
| Maximum Service Temperature                      | KS L 9102                   | 750 °C                                                                                                           |
| Chloride                                         | ASTM C 871                  | Below 50ppm                                                                                                      |
| Water Repellency                                 | KS F 4714                   | More than 98%                                                                                                    |
| Non-Combustibility<br>(Pipe, Elbow, Board Cover) | KS L ISO 1182               | PASS                                                                                                             |

\* Chemical Composition: *SiO<sub>2</sub>* 50~60%, *Al<sub>2</sub>O<sub>3</sub>* 13~16%, *CaO* 16~25%

Properties of  
Standard  
생산규격

| Description | Product Size        | Length               | Thickness(mm)                |
|-------------|---------------------|----------------------|------------------------------|
| Pipe        | From 0.5" to 44"    | 1m                   | From 20 mm to Designed Value |
| Elbow       | From 4" to 40"      | Up to Designed Value | From 20 mm to Designed Value |
| Board       | Curved 46"~<br>Flat | 1m <sup>2</sup>      | From 20 mm to Designed Value |
| Felt        |                     | 10m/Roll             | 25 mm                        |





# *Easy Application* 탁월한 시공성

Installs Easily: Up to 60% Less labor; Less Waste; Simple Installation over Heat Tracing.

Turnaround Schedules Reduced: Easy Installation Reduces Contractor Time in Field.

Design Savings: Less Pipe Rack Space Required Since Thinner Insulation may be Used with Equal or Better Heat Conservation Capabilities.

타 보온재 대비 시공 및 취급 편리로 초보 인력시공 가능,  
비산 먼지 감소로 타 작업 동시 수행,  
Piece감소에 따른 빠른 시공 등으로 공기 단축이 가능합니다.





## ESLIN<sup>®</sup> Economical Insulation Thickness



| Temp.<br>(°C)  | 60 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Size<br>(inch) | 60 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
| 1/2            | 20 | 20  | 20  | 25  | 25  | 25  | 25  | 30  | 30  | 35  | 35  | 35  | 40  |
| 3/4            | 20 | 20  | 25  | 25  | 25  | 30  | 30  | 30  | 35  | 35  | 40  | 45  | 45  |
| 1              | 20 | 25  | 25  | 30  | 30  | 35  | 35  | 40  | 40  | 40  | 45  | 45  | 45  |
| 1 1/2          | 25 | 25  | 35  | 35  | 40  | 40  | 45  | 45  | 45  | 50  | 50  | 55  | 60  |
| 2              | 25 | 30  | 35  | 40  | 40  | 45  | 45  | 45  | 50  | 50  | 60  | 60  | 70  |
| 3              | 25 | 35  | 45  | 45  | 55  | 55  | 55  | 55  | 65  | 65  | 75  | 75  | 75  |
| 4              | 30 | 40  | 45  | 45  | 55  | 60  | 60  | 70  | 70  | 75  | 75  | 75  | 75  |
| 6              | 35 | 50  | 50  | 65  | 65  | 65  | 70  | 75  | 80  | 85  | 90  | 90  | 90  |
| 8              | 40 | 50  | 55  | 65  | 70  | 75  | 75  | 85  | 85  | 95  | 100 | 105 | 115 |
| 10             | 40 | 50  | 70  | 70  | 70  | 75  | 90  | 90  | 90  | 100 | 110 | 120 | 125 |
| 12             | 40 | 55  | 70  | 75  | 75  | 75  | 90  | 90  | 90  | 110 | 120 | 125 | 135 |
| 14             | 40 | 55  | 70  | 75  | 75  | 75  | 90  | 90  | 90  | 115 | 125 | 125 | 135 |
| 16             | 40 | 60  | 70  | 75  | 75  | 90  | 90  | 100 | 115 | 115 | 125 | 135 | 140 |
| 18             | 40 | 60  | 70  | 75  | 75  | 90  | 90  | 110 | 115 | 125 | 130 | 140 | 155 |
| 20             | 40 | 60  | 70  | 75  | 75  | 90  | 90  | 120 | 120 | 130 | 140 | 140 | 155 |
| 24             | 40 | 60  | 75  | 75  | 75  | 90  | 90  | 120 | 130 | 130 | 145 | 160 | 160 |
| 30             | 40 | 65  | 75  | 75  | 75  | 90  | 90  | 125 | 135 | 145 | 150 | 160 | 170 |
| 36             | 40 | 65  | 75  | 75  | 75  | 100 | 125 | 125 | 135 | 150 | 160 | 170 | 170 |
| Flat           | 40 | 75  | 90  | 110 | 130 | 150 | 150 | 150 | 150 | 170 | 170 | 170 | 170 |

※ 39 Won/ kw · hr (Dubai Crude Oil Price \$ 80)

※ 열량가격: 39원 / kw.hr (Dubai Crude Oil Price \$ 80) - 연간 사용 시간 7,200hr

\* 7,200 hour/year

• 연간 사용 시간 7,200hr

▶ Note: Above data is in accordance with KS F 2803.

Calorific value price (39 Won/ kw · hr) can fluctuate depending on figures.

- 상기 데이터는 KS F 2803에 준하여 산출된 값
- 열량가격은 산출된 Date의 수치에 따라 변동될 수 있음

## ESLIN<sup>®</sup> Heat Loss Based Insulation Thickness

| Temp. of<br>pipe<br>(°C) | 100         |                                | 150         |                                | 200         |                                | 250         |                                | 300         |                                | 350         |                                | 400         |                                | 450         |                                | 500         |                                | 550         |                                | 600         |                                |
|--------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|
| Size<br>(inch)           | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) | Thk<br>(mm) | Heat<br>loss<br>(kcal/<br>m.h) |
| 1/2                      | 20          | 14                             | 20          | 23                             | 30          | 11                             | 30          | 36                             | 30          | 46                             | 30          | 57                             | 40          | 61                             | 40          | 73                             | 50          | 78                             | 50          | 92                             | 50          | 107                            |
| 3/4                      | 20          | 16                             | 20          | 27                             | 30          | 13                             | 30          | 41                             | 30          | 52                             | 30          | 65                             | 40          | 68                             | 40          | 82                             | 50          | 87                             | 50          | 100                            | 60          | 110                            |
| 1                        | 20          | 19                             | 20          | 31                             | 30          | 15                             | 30          | 47                             | 30          | 60                             | 40          | 63                             | 40          | 77                             | 50          | 82                             | 50          | 98                             | 50          | 115                            | 60          | 123                            |
| 1 1/2                    | 20          | 24                             | 20          | 40                             | 30          | 19                             | 30          | 59                             | 30          | 75                             | 40          | 79                             | 40          | 96                             | 50          | 109                            | 50          | 120                            | 50          | 128                            | 60          | 149                            |
| 2                        | 20          | 28                             | 20          | 47                             | 30          | 22                             | 30          | 69                             | 30          | 88                             | 40          | 91                             | 40          | 111                            | 50          | 116                            | 50          | 138                            | 60          | 146                            | 70          | 156                            |
| 3                        | 20          | 39                             | 20          | 65                             | 30          | 29                             | 30          | 92                             | 40          | 96                             | 40          | 119                            | 50          | 125                            | 60          | 133                            | 60          | 158                            | 60          | 186                            | 70          | 198                            |
| 4                        | 20          | 48                             | 20          | 80                             | 30          | 35                             | 30          | 112                            | 40          | 116                            | 50          | 123                            | 50          | 149                            | 60          | 158                            | 60          | 188                            | 70          | 200                            | 70          | 233                            |
| 6                        | 20          | 67                             | 20          | 112                            | 30          | 49                             | 30          | 154                            | 40          | 157                            | 50          | 165                            | 50          | 200                            | 60          | 210                            | 60          | 207                            | 70          | 262                            | 80          | 280                            |
| 8                        | 20          | 85                             | 20          | 141                            | 30          | 61                             | 30          | 193                            | 40          | 196                            | 50          | 204                            | 50          | 216                            | 60          | 231                            | 60          | 307                            | 70          | 321                            | 80          | 340                            |
| 10                       | 20          | 104                            | 20          | 173                            | 30          | 74                             | 30          | 236                            | 40          | 237                            | 50          | 246                            | 60          | 258                            | 70          | 275                            | 70          | 326                            | 70          | 283                            | 90          | 370                            |
| 12                       | 20          | 122                            | 20          | 203                            | 30          | 87                             | 30          | 275                            | 40          | 276                            | 50          | 284                            | 60          | 298                            | 70          | 316                            | 70          | 375                            | 80          | 397                            | 90          | 423                            |
| 14                       | 20          | 133                            | 20          | 222                            | 30          | 95                             | 30          | 300                            | 40          | 300                            | 50          | 309                            | 60          | 323                            | 70          | 342                            | 70          | 406                            | 80          | 429                            | 90          | 456                            |
| 16                       | 20          | 151                            | 20          | 252                            | 30          | 107                            | 30          | 340                            | 40          | 338                            | 50          | 347                            | 60          | 363                            | 70          | 384                            | 70          | 455                            | 80          | 480                            | 90          | 509                            |
| 18                       | 20          | 169                            | 20          | 282                            | 30          | 119                            | 30          | 379                            | 40          | 377                            | 50          | 386                            | 60          | 403                            | 70          | 425                            | 70          | 504                            | 80          | 530                            | 90          | 562                            |
| 20                       | 20          | 187                            | 20          | 311                            | 30          | 132                            | 30          | 418                            | 40          | 415                            | 50          | 425                            | 60          | 442                            | 70          | 466                            | 70          | 552                            | 80          | 581                            | 90          | 615                            |
| 24                       | 20          | 223                            | 20          | 371                            | 30          | 157                            | 30          | 497                            | 40          | 492                            | 50          | 502                            | 60          | 522                            | 70          | 548                            | 70          | 650                            | 80          | 682                            | 90          | 720                            |
| 30                       | 20          | 277                            | 20          | 461                            | 30          | 194                            | 30          | 615                            | 40          | 608                            | 50          | 618                            | 60          | 640                            | 70          | 671                            | 70          | 796                            | 80          | 833                            | 90          | 826                            |
| 36                       | 20          | 330                            | 20          | 550                            | 30          | 231                            | 30          | 733                            | 40          | 724                            | 50          | 734                            | 60          | 759                            | 70          | 794                            | 70          | 941                            | 80          | 984                            | 100         | 945                            |
| Flat                     | 25          | 101                            | 25          | 162                            | 35          | 227                            | 35          | 299                            | 50          | 200                            | 50          | 246                            | 75          | 203                            | 75          | 243                            | 100         | 218                            | 125         | 207                            | 125         | 241                            |

### Note

- Insulation thickness for electric traced lines are based on the following maximum heat losses: 180kcal/m<sup>2</sup>h
- Minimum insulation thickness is 20mm (3/4")
- Maximum insulation outer surface temperature is 60°C (140°F).
- Ambient temperature: 40°C (104°F).

# *Reusable Material* 재활용성

Unbreakable: May be Removed and Reinstalled During Plant Maintenance Activities & Turnarounds.

재활용 가능한 고밀도 유리장섬유로 폐기물 감소 및  
Maintenance 비용이 감소합니다.





### Application 적용

1. Application 적용 : Refinery, District heating plant and Power station 정유화학 및 지역난방, 발전소
2. Part 적용분야 : Heat Conservation, Personnel Protection, Anti-sweat, Anti-freezing, Acoustic



### Application of Shipbuilding 적용 선사

Company: HHI, DSME, SHI, HSHI, SUNGDONG Shipbuilding & Marine Engineering  
 Part: Exhaust gas pipe, Ware House, A-60 Bulk Head, Deck, and Sound Part

1. 적용선사 : HHI, DSME, SHI, HSHI, 성동조선해양
2. 적용분야 : Exhaust Gas Pipe, W/H, A-60 Bulk Head, Deck, Sound Part  
 보온&보냉 A-60 Sound 전 분야





# *Energy Saving* 에너지 절약

**ESLIN®** is up to 100% more energy efficient than other commonly used materials such as Calcium Silicate and Perlite.

타 보온재 동일 두께 **ESLIN®** 적용 시 Energy Saving 극대화 할 수 있습니다.

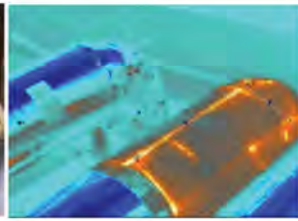
Typical Details for Piping Insulatio



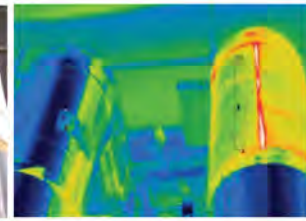


## Energy Saving

### 에너지 절감 사례



| Surface Temp     | Max    | Min   | Average |
|------------------|--------|-------|---------|
| ESLIN            | 43.9℃  | 26.8℃ | 35.2℃   |
| Calcium Silicate | 131.9℃ | 47.7℃ | 70.9℃   |



| Surface Temp     | Max   | Min   | Average |
|------------------|-------|-------|---------|
| ESLIN            | 35.8℃ | 28.4℃ | 28.4℃   |
| Calcium Silicate | 52.1℃ | 35.3℃ | 40.9℃   |

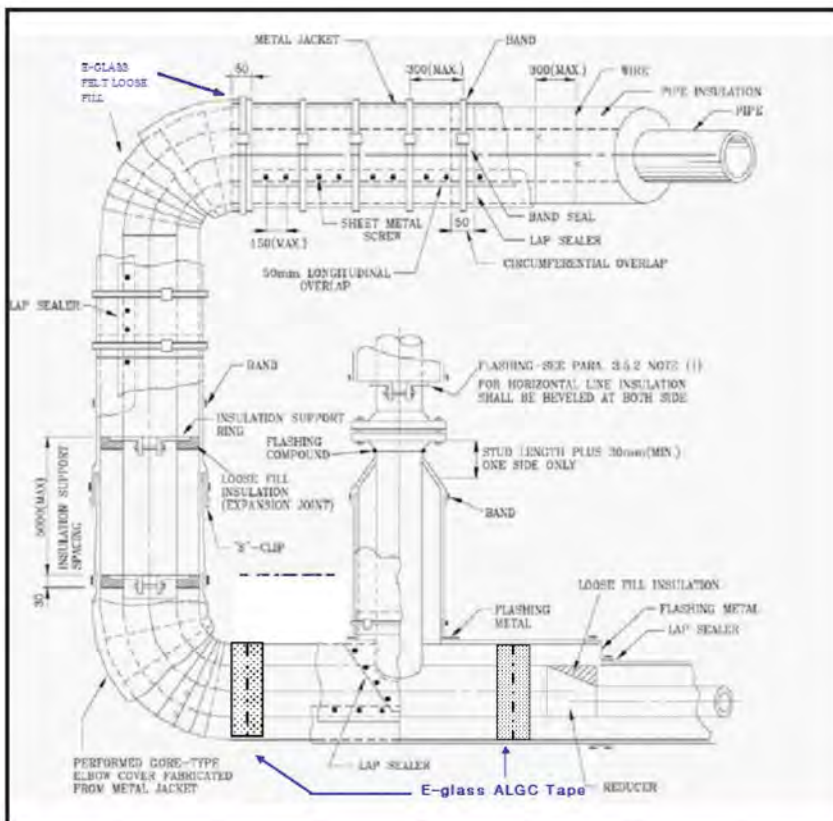
Steam : HPS 292℃  
Pipe : 10 inch  
Thickness of insulation : 150mm

Ambient Temperature : 23℃  
Calorie value price : 85/kWh  
(2015.12 Korea Power Exchange reference)

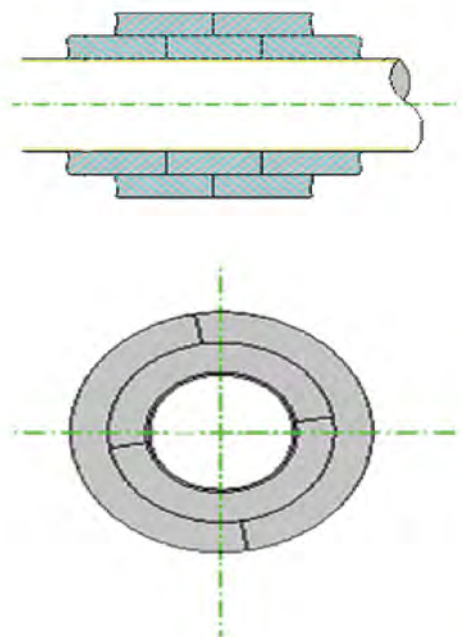
|                           | ESLIN<br>A | Calcium Silicate<br>B | Remark<br>A - B |
|---------------------------|------------|-----------------------|-----------------|
| Surface Temp.<br>(℃)      | 31.8       | 55.9                  | - 24.1          |
| Heat Loss<br>(W/m,h)      | 134.3      | 628.8                 | 494.5           |
| Energy Cost<br>(KRW/m,yr) | 99,999     | 468,204               | 368,204         |

Energy Saving  
 $494.5 \text{ Watt/m} \times 365 \text{ day/yr} \times 24 \text{ hrs/day} \times 0.001 \times 85 \text{ kW} \cdot \text{hr} = \text{KRW } 368,204/\text{yr} \cdot \text{m}$

## Specification



- 2Layer 보온재의 격자 교차 시공





**ESLIN<sup>®</sup>**



**ESLIN<sup>®</sup> CORPORATION**

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