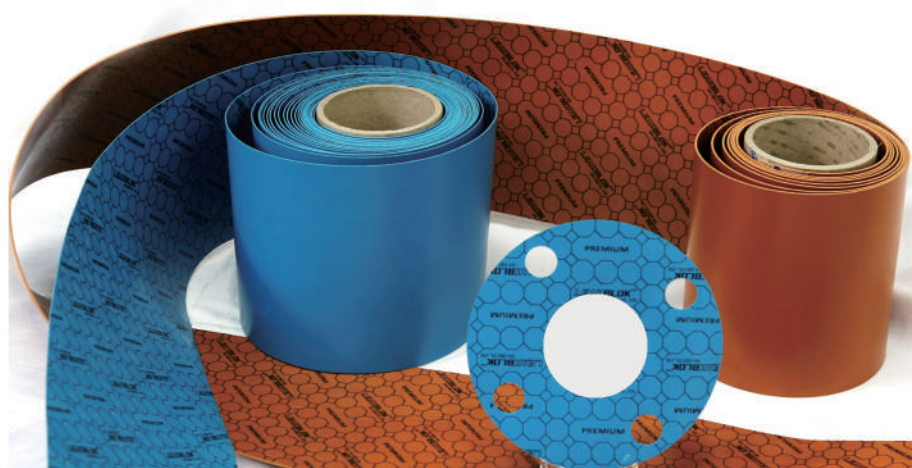
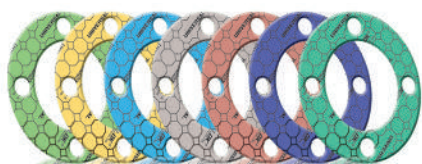


Tech-How Make the Difference!

**Next Generation
World Firstly Developed
Eco-Friendly
Flange Gasket Materials**



Environmentally Friendly Solvent Free Process
LEAKBLOK®



www.jeilens.co.kr

JES 제일E&S주식회사
JEIL E&S CO.,LTD

Environmentally Friendly Solvent Free Process **LEAKBLOK®**

Since established 1969, JEIL E&S has been dedicated to manufacturing wide range of proven high quality sealing and ahead giant leap for strong enterprise of 'Hidden Champion' in soft gasket materials for next century. Specially invented LEAKBLOK®, came into the world with significant R&D investment and state-of-the-art facilities extension and proudly represent environmentally friendly compressed gasket materials.

Our new UMCS* & UMPS* have officially awarded NET* certifying from MKE*, Korean government. We set the target no use VOC* contents on all new LEAKBLOK® process by guarantee considerable improvement of superior sealability, strong durability and outstanding flexibility and other performances. Portable water application with WRAS* approval and suitable for steam, clean, contaminated fluid lines. Next generation flange gasket material, LEAKBLOK® especially represent superior sealability on gas line and excellent electrical isolation performance.

1969년 설립 이후 반세기 동안 최고의 품질과 성능을 지켜온 제일 E&S가 향후 100년을 준비하는 강소기업으로 나아가기 위한 새로운 도약을 준비 하고 있습니다. R&D 센터를 확장 이전하고, 신규 설비에 대한 과감한 투자로 개발한 친환경 압축시트 LEAKBLOK®을 여러분께 소개해 드립니다.

자사에서 개발한 UMCS* & UMPS*는 새로운 기술을 증명하는 NET* 인증을 취득하였으며, VOC* 을 사용하지 않는 친환경 공법에 의하여 기존압축 시트 대비 뛰어난 밀봉성, 강한 내구성과 탁월한 유연성을 보여 주고, WRAS* 인증을 통해 음용수 라인에도 적용되며, 유체의 오염이나 스팀 및 청정성이 요구되는 라인에도 사용 가능합니다. 특히 기존 압축 시트와는 달리 Gas Line 에서도 우수한 sealing 성능과 절연 성능까지 갖춘 새로운 개념의 차세대 가스켓 입니다.

*UMCS: Unique Mechanical Compounding System

*UMPS: Unique Machinery Process System

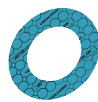
*NET: New Excellent Technology

*MKE: Ministry of Knowledge Economy

*VOC: Volatile Organic Compounds

*WRAS: Water Regulation Advisory Scheme

*MECS: Mill Edge Coiling System



Chapter 1

Global Leading Innovative Green Process

혁신적인 친환경 공법



Chapter 2

Superior Gas Permeability

탁월한 기체 기밀성



Chapter 3

Exceptional Electrical Isolation Performance

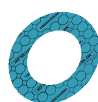
뛰어난 절연성



Chapter 4

Excellent Sealability at Low Seating Stress

낮은 체부력에서도 안정적인 밀봉성



Chapter 5

Less Deformation

낮은 변형성



Chapter 6

Easy Removability

향상된 탈착성



Chapter 7

Sheet in Roll - by MECS* 1st in the world

세계 최초 Roll 생산



Chapter 8

Excellent Productivity

향상된 가공성능

Chapter 1 Global Leading Innovative Green Process

NET* approved in 2013, specially invented unique method of UMCS* & UMPS* contribute to excellent reduction of VOC* emission because of no using solvent from compounding and manufacturing process. LEAKBLOK® is proven reliability from VOC* emission compare with existing conventional compressed sheet materials.

LEAKBLOK®은 자사가 독자개발한 UMCS* & UMPS* 공법으로 2013년 NET* 인증을 받았고, 이를 통해 VOC*를 제조공정에서부터 완제품까지 배출하지 않는 최첨단 친환경 시트임.

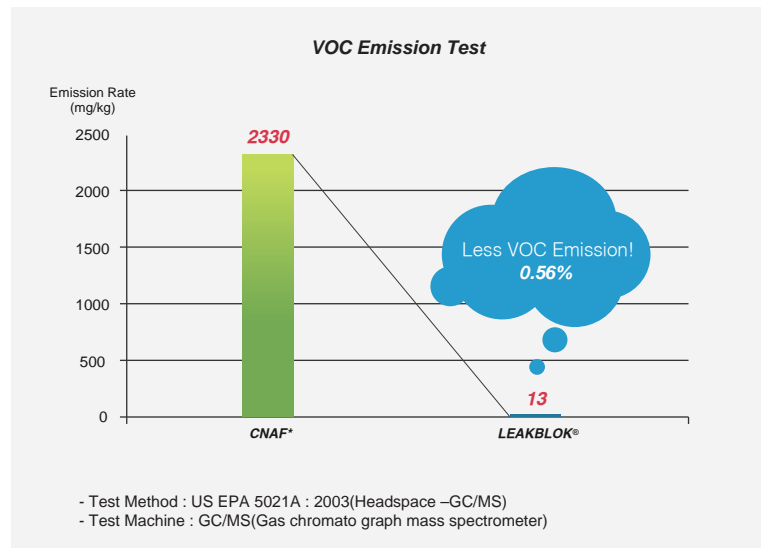
*NET: New Excellent Technology

*UMCS: Unique Mechanical Compounding System

*UMPS: Unique Machinery Process System

*VOC: Volatile Organic Compounds

*CNAF: Compressed Non-Asbestos Fiber Gasket

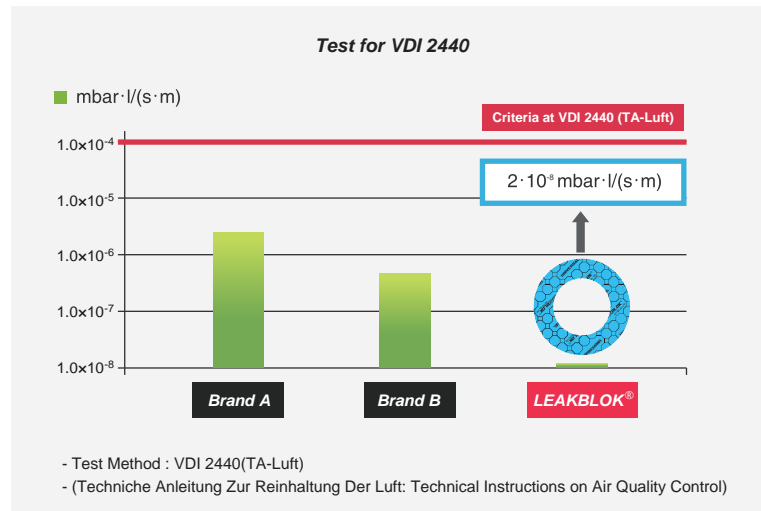


Chapter 2 Superior Gas Permeability

1. Excellent Gas Permeability

High grade of next generation gasket, LEAKBLOK® shows excellent gas permeability with dedicated protection from fugitive emission control which is considered the possible risk of fire & explosion etc. It provides distinguish level of TA-Luft acceptance criteria.

고성능의 차세대 가스켓 LEAKBLOK®은 뛰어난 기체 기밀성을 가지고 있으며 화재나 폭발등의 잠재적인 유출 위험까지도 고려한 가스켓이며 TA-Luft Test에서도 타사 제품보다는 월등히 뛰어난 Sealing 성능을 보여주고 있음.

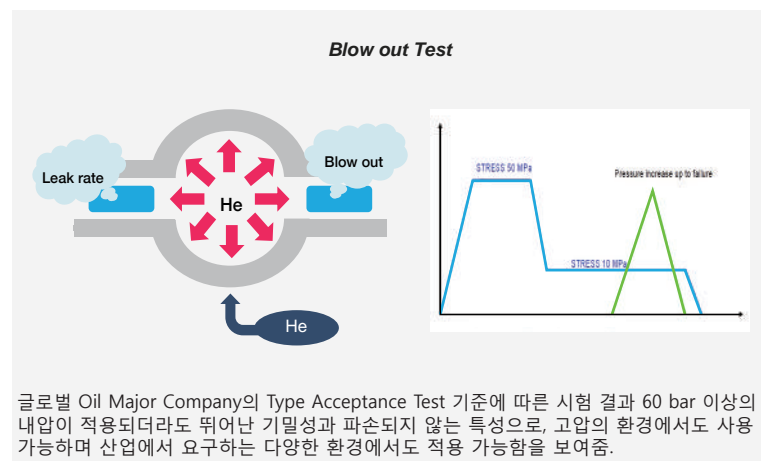


2. Peak Pressure & Blow out Test

- Test Result
- Leak rate on internal pressure applied

Internal Pressure(He)	Leak rate(atm.cm³/s)
60 bar	2.90 × 10 ⁻⁸
80 bar	2.65 × 10 ⁻⁴
100 bar	3.93 × 10 ⁻²

According to Global oil major's Type Acceptance Test, it verify stable sealing performance without leakage and breakage when internal pressure increasing over 60 bar with minimum gasket seating stress maintains. This test shall meet the qualification at variety applicable condition what related industries required.

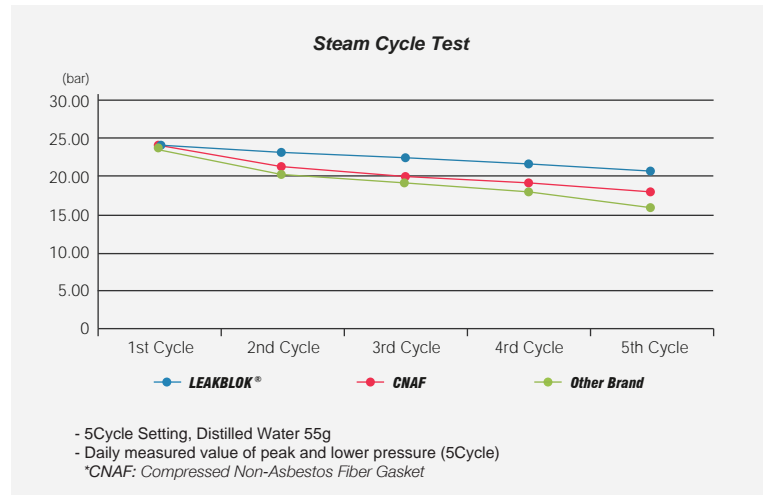


3. Steam Cycle Test

Temperature	250 °C
Fluid	Steam, 24 bar
Seating Stress	30 MPa

Based on excellent gas permeability, it provides stable sealability at steam application compare with conventional CNAF*. Normally drastic change of thermal or pressure cycling is highly effected on sealability, but high dense inner structure of LEAKBLOK® enhance much longer and lower life cycle cost for customers.

뛰어난 기체 기밀성을 바탕으로 기존 압축 가스켓 대비하여 Steam Test에도 안정적인 기밀성을 보임. 온도 및 압력의 변동은 기밀성에 영향을 미치지만, LEAKBLOK®의 우수한 조직 구조는 기밀성 향상과 내구력 증대로 고객의 가스켓 교체 비용 절감에 기여함.

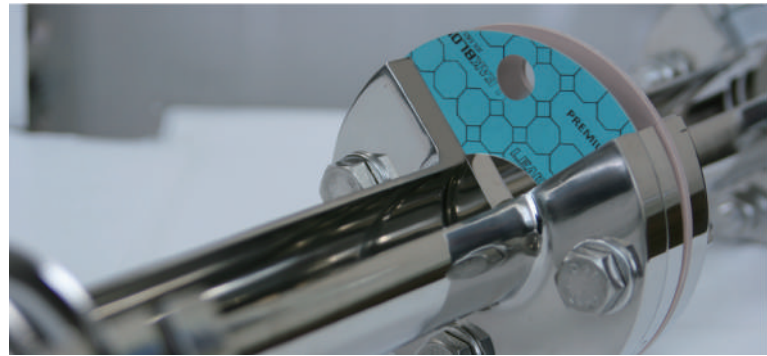


4. Durability Test

Temperature	160 °C
Fluid	Steam, 7 bar
Seating Stress	30 MPa

Actual field test performed at a chemical plant in Korea to confirm excellent durability above specified condition and leakage has not detected at steam line for 1,000days.

내구력 검증을 위해 국내 한 화학공장에서 성능을 확인하였고, 현장 스티프라인 장착 후 1,000일 이상 누설이 발생되지 않았으며 우수한 내구성으로 고객 만족에 기인함.



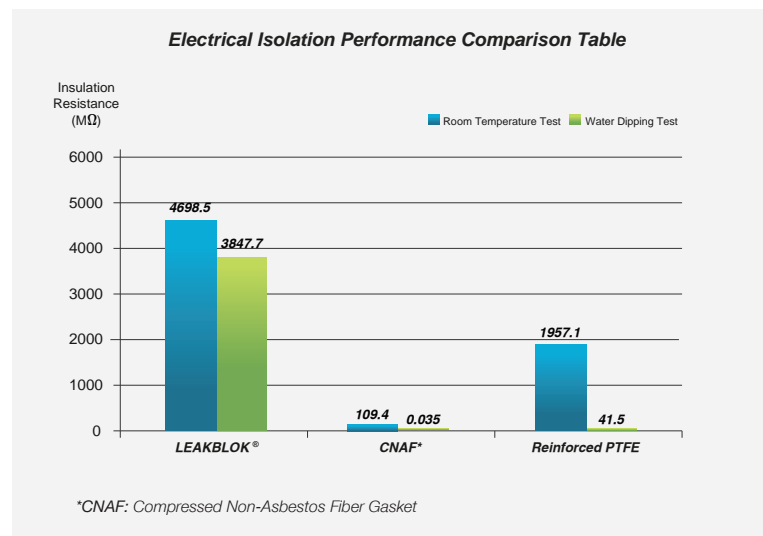
Chapter 3

Exceptional Electrical Isolation Performance

1. Electrical Isolation Performance Test

Test Method	Test Material	Insulation Resistance(MΩ)
Room Temperature Temperature : 21.0±3 °C Humidity : 42.0±10 %	LEAKBLOK®	4698.5
	CNAF	109.4
	Reinforced PTFE	1957.1
Water Dipping Dipping Time : 1 hour	LEAKBLOK®	3847.7
	CNAF	0.035
	Reinforced PTFE	41.5

Test	Unit	Ref. STD	LEAKBLOK®
Insulation Resistance	Ω	ASTM D257	3.02×10 ¹²
Volume Resistance	Ω.cm	ASTM D257	4.65×10 ¹⁴
Dielectric Strength	kV/mm	ASTM D149	13.39
Tangent δ (ε')	-	ASTM D150	0.004
Dielectric Constant (ε'')	-	ASTM D150	13.39



In accordance with authorized institute, LEAKBLOK® represents outstanding application of electrical isolation performance. Compare to testing result with conventional CNAF* and reinforced PTFE materials, LEAKBLOK® has the highest level of electrical isolation performance at ambient and water dipping conditions.

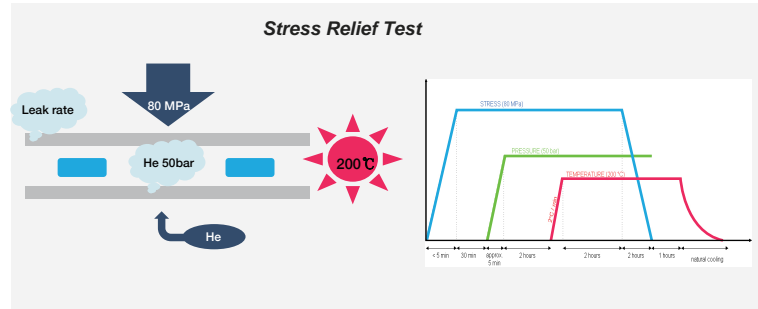
LEAKBLOK® 은 공인 시험 기관의 검증을 통하여 기존 압축 가스켓과 reinforced PTFE 재질 보다 탁월한 전기적 특성을 나타내며 상온의 침수 조건에도 높은 수준의 절연 성능을 보임.

Chapter 4 Excellent Sealability at Low Seating Stress

1. Stress Relief Test

Tightness	Reading Leak rate on 10 MPa stress point
A leak = 5×10^{-3} stress applied on the gasket <= (MPa)	5×10^{-5} atm.cm ³ /s (Stress 10 MPa applied)
Stress applied on the gaskets up to tightness failure <= (MPa)	

With superior heat resistance of LEAKBLOK®, above test result demonstrates excellent sealability on against critical applicable conditions (High temperature & pressure but decreasing seating stress). This strength has shown stable sealing advantage on relief bolting stress at high temperature condition.



LEAKBLOK®의 뛰어난 내열/기밀 성능은 급변하는 운전 조건 (높은 온도/ 고압/ 체부면압 감소) 에서도 Sealing 성능이 유지됨을 확인 할 수 있으며, 이러한 특성으로 인하여 고온 환경에서 체결부의 이완으로 인한 누설 문제에도 안정적으로 사용 가능한 장점을 가짐.

2. Low Seating Stress Test

With special UMCS*, LEAKBLOK® shows outstanding stability at low sealing stress and suitable where difficulty to applying standard torque in actually assembling construction fields.

LEAKBLOK®의 특수 UMCS* 공법을 통하여, 압축 가스켓에서 적용이 어려운 낮은 체부 압력에도 우수한 Sealing 성능을 보이며 현장 작업시, 충분한 체결이 어려운 열악한 환경에서도 적용 가능함.

*UMCS: Unique Mechanical Compounding System

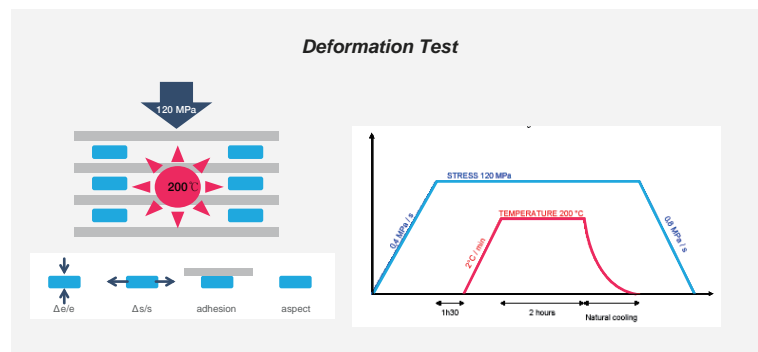
Specimen	Test Result		
	LEAKBLOK®	CNAF	
Seating Stress(MPa)	20	20	40
N ₂ Leakage Test (10 bar)	No Leak	Leak(Permeation)	No Leak
Hydraulic Test (31 bar)	No Leak	No Leak	No Leak

Chapter 5 Less Deformation

Deformation Test (Preselection Test)

Simultaneously applied condition of high seating stress 120MPa and 200°C, LEAKBLOK® has strong physical properties and less deformation while testing verification of gasket thickness, surface change and breakage.

120MPa 의 높은 체부 면압과 200°C의 고온 조건에서도 LEAKBLOK® 의 뛰어난 물리적 강도를 통해, 가스켓의 두께 및 체적변화가 최소화 됨을 확인할 수 있음.



$$\Delta e/e = \frac{\text{reference thickness} - \text{final thickness}}{\text{reference thickness}} \times 100$$

$$\Delta s/s = \frac{\text{final Surface} - \text{Initial Surface}}{\text{Initial Surface}} \times 100$$

Test Result					
Test Name	Criteria	Gasket 1	Gasket 2	Gasket 3	Acceptance
$\Delta e/e$	Max 20 %	17.38	16.4	17.52	Yes
$\Delta s/s$	Max 25 %	21.57	22.6	21.43	Yes

Chapter 6 Easy Removability

1. Removability Test

LEAKBLOK® has designed to consider maintenance cost reduction in industrial fields. Performed testing under the condition of 120MPa and 200℃, LEAKBLOK® has shown excellent and easy removability with no adhesive on the flange which dedicated to cost saving and flange protection.

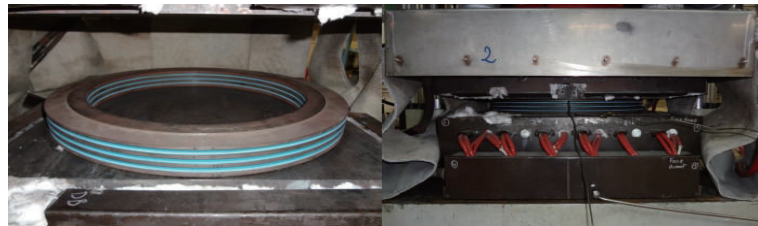
120MPa 의 높은 체부 면압과 200℃의 고온 조건에서도 LEAKBLOK® 만의 뛰어난 탈착 성능으로 유지 보수 시 손쉽게 가스켓 교체가 가능하며, 플랜지 표면 손상을 최소화하여 교체할 수 있음.

2. Removability for Heating Cycle Test

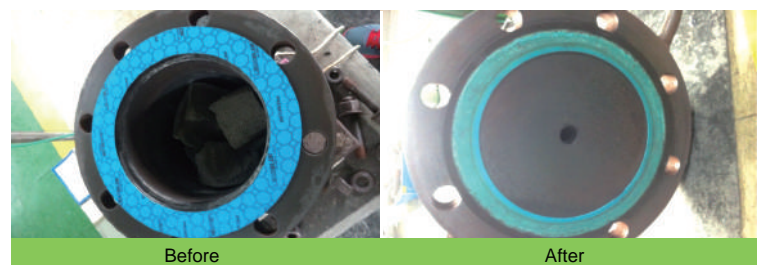
- High Temperature and Pressure test
- 200℃ × 96 hours : 1 Cycle × 4 Days
(10 hours Heating + 14 hours Cooling)

ITEM	Removability (Surface check)
LEAKBLOK®	Seating & Removability : ★★★★★ Easy removal and no creep and deformation.
Brand "A"	Seating & Removability : ★★★★☆ Easy removal and no creep and deformation.
Brand "B"	Seating & Removability : ★★★☆☆ Stick at surface and need to force to remove.

*CNAF: Compressed Non-Asbestos Fiber Gasket



Condition: Seating Stress 120MPa and 200℃
Test Result : No Adhesion

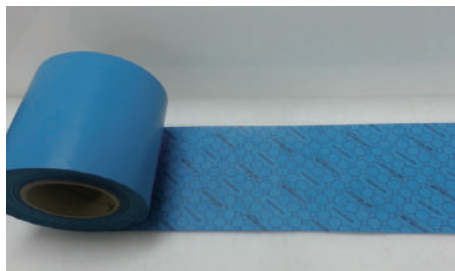


Outstanding surface quality of LEAKBLOK® has an exceptional removability without anti-stick surface treatment. Unique surface roughness fulfill less deformation, good adaptability for flange irregularities.

LEAKBLOK®의 뛰어난 Anti-Stick 성능으로 별도의 후처리를 하지 않아도 기존 압축시트 보다 월등한 탈착성을 보여줌.

Chapter 7 Sheet in Roll - by MECS 1st in the world

1. Mill Edge Coiling System(MECS) as Various Customers Requirments

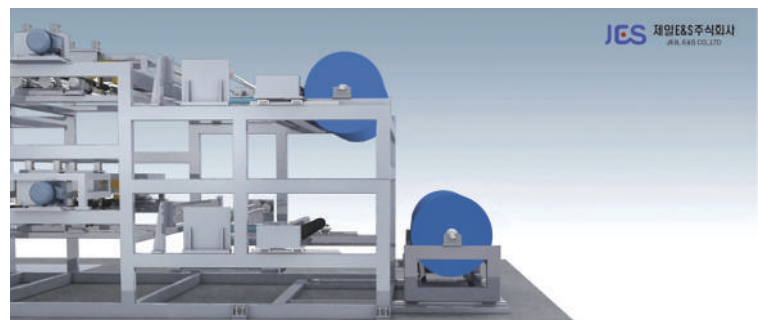


Thickness	Width	Length
0.8mm~3.2mm	50"(1270mm) 60"(1500mm)	50"(1270mm) 60"(1500mm) 3M ~ 20M & etc

(Please consult to maximum Length with JEIL Sales team.)

*SECS: Slit Edge Coiling System

*MECS: Mill Edge Coiling System



Focus on cost minimization, LEAKBLOK® is independently supplying MECS*/SECS* considerably efficient to cost reduction, benefits from unnecessary loss, productivity enhancement etc. It provides unique 'TAILOR MADE' solution from SECS* with various width of roll base international industrial standard by fulfill customer's automation facilities, customized process characteristics.

LEAKBLOK® 만의 독자적인 MECS* & SECS* 공법으로 "고객 맞춤형" 대량 생산 시스템에 최적화된 폭과 길이로 공급 가능하여 Loss 절감 및 생산성 향상을 통하여 혁신적인 원가 절감 효과를 가짐.

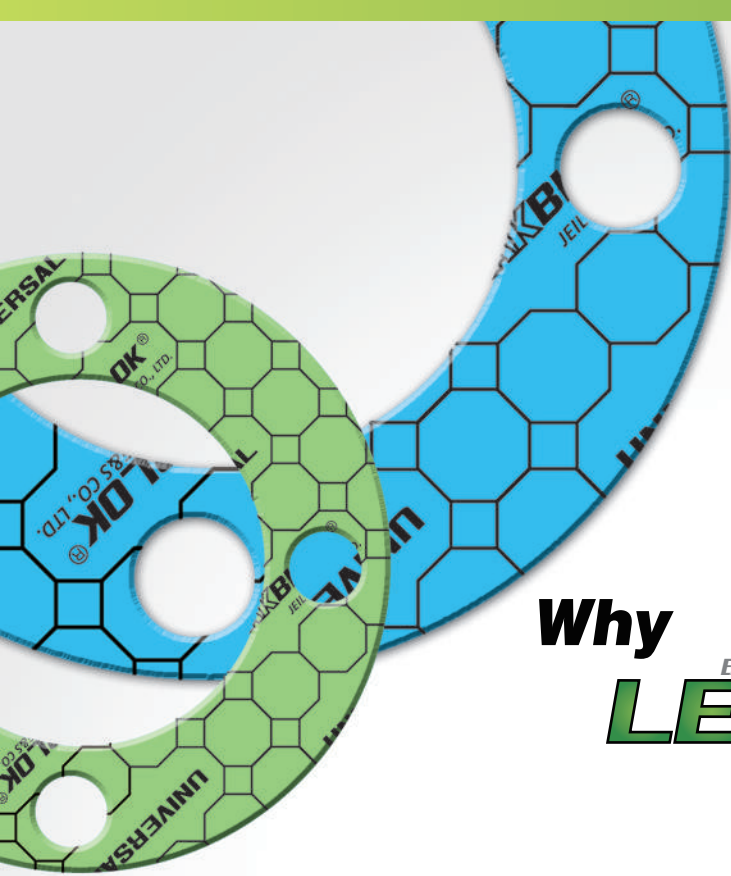
Chapter 8 Excellent Productivity

Specially designed by UMCS* process contribute to remarkable improvement on high productivity and excellent die-cutting ability caused from conventional CNAF*.

LEAKBLOK® 만의 독자적인 UMCS* 공법으로 기존 CNAF* 에서 발생되는 낮은 가공성으로 인한 생산성 저하 문제를 획기적으로 개선하였으며, LEAKBLOK® 의 손쉬운 타발성, 가공성으로 고객 생산성 향상에 기여함.

*UMCS: Unique Mechanical Compounding System

*CNAF: Compressed Non-Asbestos Fiber Gasket



Why
Environmentally Friendly Solvent Free Process
LEAKBLOK[®] ?
for customers
around the World

- L**ower Costs for Client (Time/Process/Handle etc)
- E**co-Friendly for Client's Purpose
- A**ggressive Sales with LEAKBLOK[®]
- K**eeping Workshop Clean & Tiny
- B**esides, Make your Plants SAFE
- L**eading the Market with LEAKBLOK[®]
- O**vious way to get good Productivities
- K**orean Origin from JEIL's TECH Support



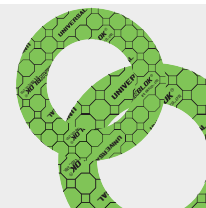
LEAKBLOK® Properties

Grade		LEAKBLOK® Premium			
Composition		Aramid Fiber Glass Fiber NBR Binder	Aramid Fiber Glass Fiber NBR Binder	Aramid Fiber Glass Fiber SBR Binder	Aramid Fiber Glass Fiber NBR Binder
Model No		P100	P200	P300	P400
Basic Color		Green	Blue	Silver	Brown
Temperature	Continuous Operating(℃)	-50~180	-150~220	-150~220	-150~260
	Short-term peak(℃)	-100~260	-196~350	-196~350	-196~430
Pressure	Short-term peak(bar)	60	80	80	100
Test Method	Physical Properties	P100	P200	P300	P400
ASTM D792	Density[g/cm³]	1.9	1.9	1.9	1.9
ASTM F152	Tensile strength Across grain MPa[kg/cm²]	10.0 (102)	15.0 (153)	15.0 (153)	16.7 (170)
ASTM F36J	Compressibility[%]	10	9	9	8
ASTM F36J	Recovery[%]	75	71	73	63
ASTM F146	Fluid Resistance after 5hrs immersions ASTM # 3 oil(150℃) Thickness Increase[%]	4	3	10	4
	ASTM Fuel B(20~30℃) Thickness Increase[%]	7	6	10	4
	Weight Increase[%]	10	9	17	12
DIN 52913	Relaxation Stress[MPa]				
	- 50MPa 16hrs / 175℃	20	38.2	37.6	-
	- 50MPa 16hrs / 300℃	-	-	-	38.2
BS 7531	Relaxation Stress[MPa] - 40MPa 16hrs / 300℃	-	23.7	23.8	25.1
VDI 2440 (TA-LUFT)	Leak rate [mbar.l/(s.m)]	2x10 ⁻⁸	2x10 ⁻⁸	2x10 ⁻⁸	2x10 ⁻⁸
DIN 3535/6	Gas Permeability[ml/min]	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01
Type Approval & Test Certificate		ISO 9001/14001/18001, PED, NET Lloyd's & ABS TA, TA-Luft, WRAS, Fire Endurance Test(ISO 19921 & 19922)			
pH Range		4-11 Above is general range and has no guarantee for every case. Please contact us for further details.			
Thickness		0.8mm ~ 3.2mm			
Width		1270mm(50"), 1500mm(60")			
Length		1270mm(50"), 1500mm(60"), 3M~10M, 15M~20M & ETC (Please consult to maximum length with JEIL sales team.)			
Applicable Fluids		Portable Water, Oils, Fuels Salt Solution, gas line, Mild acids and alkalis & ETC			

* All data are 1.5mm thickness typical value.

* 상기 물성치는 1.5t 제품의 실측값이며, 전체물성을 대표하지는 않음.

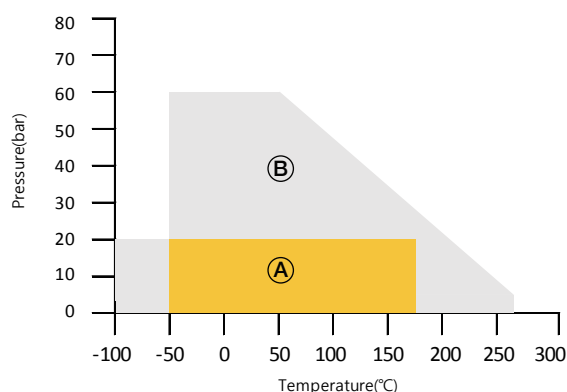
Compressed Asbestos-Free Gasket **LEAKBLOK® Premium P100**



MATERIAL PROPERTIES

Product Name	LEAKBLOK® Premium P100
Color	Green(Black Printed)
Composition	Aramid Fiber + NBR Binder
Fluids Service	Portable Water, Oils, Fuels, Salt Solution, Mild acids and alkalis, gas line
Pressure	Short-term peak 60bar(870 psi)
Temperature	Continuous -50℃(-58°F) ~ 180℃(356°F) Short-term peak -100℃(-148°F) ~ 260℃(500°F)
pH range	4-11
Thickness(mm)	0.8 ~ 3.2
Size(mm)	1270(W)×1270(L), 1500(W)×1500(L) Available in Rolls.
Certificates	Lloyd's & ABS Type Approval , TA-Luft(VDI 2440), WRAS Fire Endurance Test(ISO 19921 & 19922)

SERVICE RANGE



Area (A)	Satisfactory area subject to chemical compatibility
Area (B)	Usually suitable but required technical recommend by JEIL Technical team
P×T(Max)	psi × °F (bar × °C) / 309,720(10,800)

PHYSICAL PROPERTIES

Test Method	Description	LEAKBLOK® P100
ASTM D792	Density (g/cm³)	1.9
ASTM F152	Tensile Strength Across grain. MPa (kgf/mm²)	10.0(1.02)
ASTM F36 Procedure J	Compressibility (%) Recovery (%)	10 75
DIN 3535 - 6	Gas permeability (ml/min)	≤ 0.01
DIN 52913	Relaxation Stress(MPa) -50MPa 16 hours @ 175℃	20
VDI 2440 (TA - Luft)	Leak rate (mbar.l / (s.m)) -at 150℃ 48 hours	2·10 ⁻⁸

IMMERSION PROPERTIES

Test Method	Description	LEAKBLOK® P100
ASTM F146		
at 150 °C×5hrs		
ASTM Oil no 3	Thickness Increase (%)	4
at 20~30 °C×5hrs		
ASTM Fuel B	Thickness Increase (%) Weight Increase (%)	7 10

GASKET DESIGN DATA

Thickness (mm)	Gasket Factor(m)	Min. Design Seating Stress(y) Kgf/cm² (psi)
3.2	2.00	112(1600)
1.6	2.75	260(3700)
0.8	3.50	457(6500)

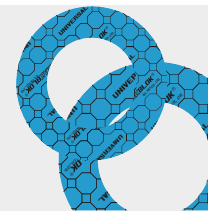
* All data are 1.5mm thickness typical value.

Innovative technology, LEAKBLOK®, absolutely distinguished from the traditional way of calendar roll production, It specially invented with environmentally friendly solvent free process.
Compare with previous product, it shows strong durability and superior at low seating stress.
Suitable for use Low pressure steam and clean line, excellent protection of fluid contamination.

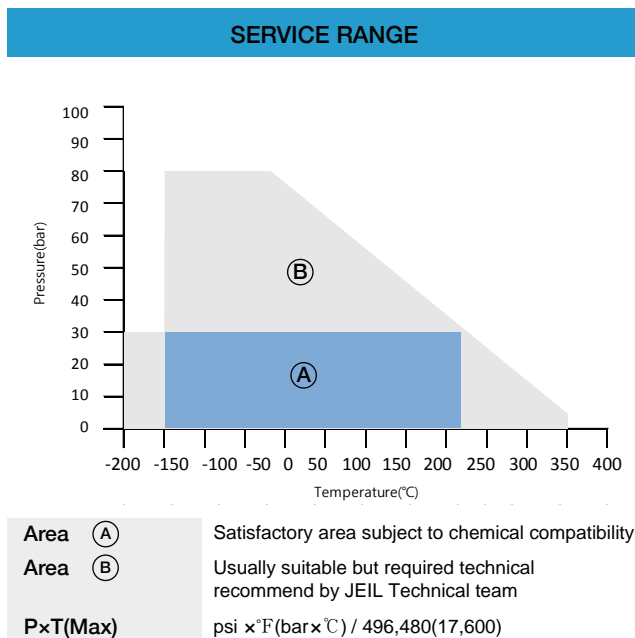
WARNING

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- Please consult to maximum length with JEIL sales team.

Compressed Asbestos-Free Gasket **LEAKBLOK® Premium P200**



MATERIAL PROPERTIES	
Product Name	LEAKBLOK® Premium P200
Color	Blue(Black Printed)
Composition	Aramid Fiber + NBR Binder
Fluids Service	Portable Water, Oils, Fuels, Salt Solution, Mild acids and alkalis, gas line
Pressure	Short-term peak 80bar (1160 psi)
Temperature	Continuous -150℃ (-238°F) ~ 220℃ (428°F) Short-term peak -196℃ (-321°F) ~ 350℃ (660°F)
pH range	4-11
Thickness	0.8 ~ 3.2(mm)
Size	1270(W)×1270(L), 1500(W)×1500(L) Available in Rolls.
Certificates	Lloyd's & ABS Type Approval , TA-Luft(VDI 2440), WRAS, BS 7531 Grade Y Fire Endurance Test(ISO 19921 & 19922)



PHYSICAL PROPERTIES		
Test Method	Description	LEAKBLOK® P200
ASTM D792	Density (g/cm³)	1.9
ASTM F152	Tensile Strength Across grain.MPa (kgf/mm²)	15.0(1.53)
ASTM F36 Procedure J	Compressibility (%) Recovery (%)	9 71
DIN 3535 -6	Gas permeability (ml/min)	≤ 0.01
DIN 52913	Relaxation Stress(MPa) - 50MPa 16 hours @175℃	38.2
BS 7531	Relaxation Stress(MPa) - 40MPa 16 hours @300℃	23.7
VDI 2440 (TA - Luft)	Leak rate (mbar·l /(s·m)) -at 150℃ 48 hours	2·10 ⁻⁸

IMMERSION PROPERTIES		
Test Method	Description	LEAKBLOK® P200
ASTM F146 at 150℃×5hrs		
ASTM Oil no 3	Thickness Increase (%)	3
at 20~30℃×5hrs		
ASTM Fuel B	Thickness Increase (%)	6
	Weight Increase (%)	9

GASKET DESIGN DATA		
Thickness (mm)	Gasket Factor(m)	Min. Design Seating Stress(y) Kg/cm² (psi)
3.2	2.00	112(1600)
1.6	2.75	260(3700)
0.8	3.50	457(6500)

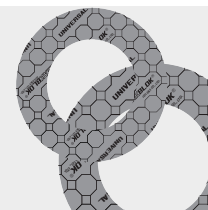
* All data are 1.5mm thickness typical value.

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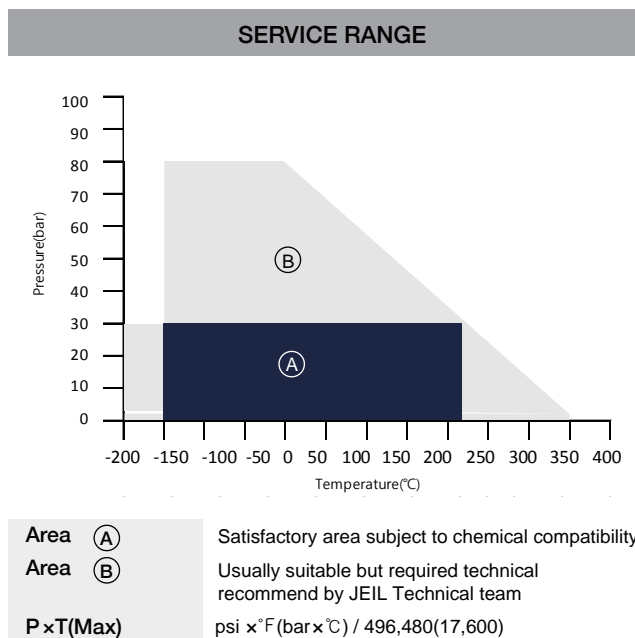
WARNING

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Compressed Asbestos-Free Gasket **LEAKBLOK® Premium P300**



MATERIAL PROPERTIES	
Product Name	LEAKBLOK® Premium P300
Color	Silver(Black Printed))
Composition	Aramid Fiber + SBR Binder
Fluids Service	Portable Water, Oils, Fuels, Salt Solution, Mild acids and alkalis, gas line
Pressure	Short-term peak 80bar (1160 psi)
Temperature	Continuous -150℃(-238°F) ~ 220℃(428°F) Short-term peak -196℃(-321°F) ~ 350℃(660°F)
pH range	4-11
Thickness	0.8 ~ 3.2(mm)
Size	1270(W)×1270(L), 1500(W)×1500(L) Available in Rolls.
Certificates	Lloyd's & ABS Type Approval , TA-Luft(VDI 2440), WRAS, BS 7531 Grade Y Fire Endurance Test(ISO 19921 & 19922)



PHYSICAL PROPERTIES		
Test Method	Description	LEAKBLOK® P300
ASTM D792	Density (g/cm³)	1.9
ASTM F152	Tensile Strength Across grain.MPa (kgf/mm²)	15.0(1.53)
ASTM F36 Procedure J	Compressibility (%)	9
	Recovery (%)	73
DIN 3535-6	Gas permeability (ml/min)	≤ 0.01
DIN 52913	Relaxation Stress(MPa)	37.6
	- 50MPa 16 hours @175℃	
BS 7531	Relaxation Stress(MPa)	23.8
	- 40MPa 16 hours @300℃	
VDI 2440 (TA - Luft)	Leak rate (mbar.l /(s.m)) -at 150℃ 48 hours	2·10 ⁻⁸

IMMERSION PROPERTIES		
Test Method	Description	LEAKBLOK® P300
ASTM F146		
at 150 °C×5hrs		
ASTM Oil no 3	Thickness Increase (%)	10
at 20~30℃×5hrs		
ASTM Fuel B	Thickness Increase (%)	10
	Weight Increase (%)	17

GASKET DESIGN DATA		
Thickness (mm)	Gasket Factor(m)	Min. Design Seating Stress(y) Kg/cm ²(psi)
3.2	2.00	112(1600)
1.6	2.75	260(3700)
0.8	3.50	457(6500)

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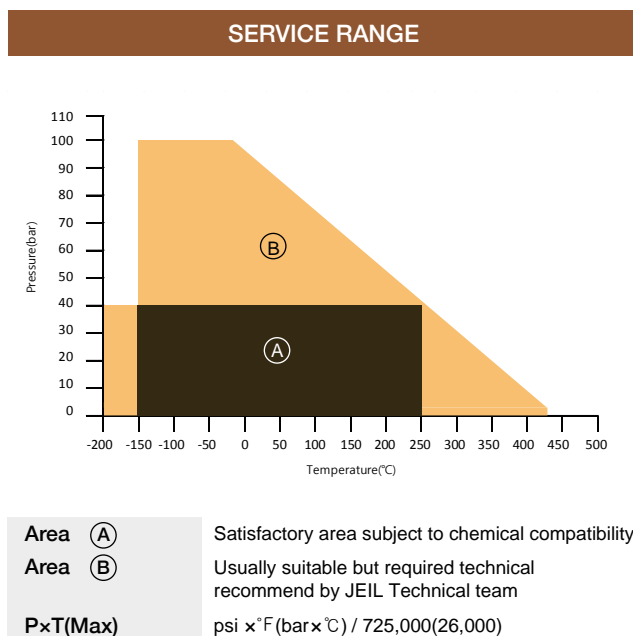
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Compressed Asbestos-Free Gasket **LEAKBLOK® Premium P400**



MATERIAL PROPERTIES	
Product Name	LEAKBLOK® Premium P400
Color	Brown(Black Printed))
Composition	Aramid Fiber + NBR Binder
Fluids Service	Portable Water, Oils, Fuels, Salt Solution, Mild acids and alkalis, gas line
Pressure	Short-term peak 100bar (1450 psi)
Temperature	Continuous -150℃(-238°F) ~ 260℃(500°F) Short-term peak -196℃(-321°F) ~ 430℃(806°F)
pH range	4-11
Thickness	0.8 ~ 3.2(mm)
Size	1270×1270, 1500×1500 (mm) Available in Rolls.
Certificates	Lloyd's & ABS Type Approval , TA-Luft(VDI 2440), WRAS, BS 7531 Grade X Fire Endurance Test(ISO 19921 & 19922)



PHYSICAL PROPERTIES		
Test Method	Description	LEAKBLOK® P400
ASTM D792	Density (g/cm³)	1.9
ASTM F152	Tensile Strength Across grain. MPa (kgf/mm²)	16.7(1.70)
ASTM F36 Procedure J	Compressibility (%) Recovery (%)	8 63
DIN 52913	Relaxation Stress(MPa) - 50MPa 16 hours @300℃	38.2
BS 7531	Relaxation Stress(MPa) - 40MPa 16 hours @300℃	25.1
DIN 3535 -6	Gas permeability (ml/min)	≤ 0.01
VDI 2440 (TA - Luft)	Leak rate (mbar-l /(s-m)) - at 150℃ 48 hours	2·10 ⁻⁸

IMMERSION PROPERTIES		
Test Method	Description	LEAKBLOK® P400
ASTM F146 at 150℃×5hrs ASTM Oil no 3	Thickness Increase (%)	4
at 20~30℃×5hrs ASTM Fuel A ASTM Fuel B	Thickness Increase (%) Thickness Increase (%)	1 4

GASKET DESIGN DATA		
Thickness (mm)	Gasket Factor(m)	Min. Design Seating Stress(y) Kgf/cm² (psi)
3.2	2.00	112(1600)
1.6	2.75	260(3700)
0.8	3.50	457(6500)

* All data are 1.5mm thickness typical value.

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Chemical Resistance of LEAKBLOK®

A general guide for selection of gasketing material

MEDIUM	MOLECULA FORMULA	P100	P200	P300	P400
Acetic acid	CH ₃ COOH	A	A	B	A
Acetic acid, glacial	CH ₃ COOH	A	A	A	A
Acetone	C ₃ H ₆ O	B	B	A	B
Acetic anhydride	(CH ₃ CO) ₂ O	A	A	A	A
Acetylene	C ₂ H ₂	A	A	B	A
Alum	KAl(SO ₄) ₂	A	A	A	A
Ammonia	NH ₃	A	A	A	A
Ammonia anhydrous	NH ₃	A	A	A	A
Ammonium hydroxide	NH ₄ OH	A	A	B	A
Aniline	C ₆ H ₅ NH ₂	C	C	B	C
Asphalt (TAR)		B	B	B	B
ASTM oil NO 1		A	A	B	A
ASTM oil NO 3		A	A	B	A
Barium chloride	BaCl ₂	A	A	A	A
Benzene	C ₆ H ₆	B	B	C	B
Benzoic acid		B	B	B	B
Boiler feed water		A	A	A	A
Borax	Na ₂ B ₄ O ₇ ·10H ₂ O	A	A		A
Butane	C ₄ H ₁₀	A	A	B	A
Butyl acetate	CH ₃ COOC ₄ H ₉	B	B	B	B
Butyl alcohol (Butanol)		A	A	A	A
Butyric acid		A	A	A	A
Calcium chloride	CaCl ₂	A	A	A	A
Calcium hydroxide	Ca(OH) ₂	A	A	A	A
Calcium sulphate	CaSO ₄	A	A		A
Carbon tetrachloride	CCl ₄	B	B	C	B
Carbonic acid 100%(Phenol)	C ₆ H ₅ OH	C	C	C	C
Carbon dioxide		A	A	A	A
Carbon disulfide	CS ₂	C	C	C	C
Caustic soda	NaOH	C	C	C	C
Chlorine (DRY)	Cl ₂	B	B	B	B
Chlorine (WET)	Cl ₂	C	C	C	C
Chromic acid	H ₂ CrO ₄	B	B	C	B
Corn oil		A	A	B	A
Chloroform	CHCl ₃	B	B	C	B
Copper sulphate	CuSO ₄	A	A	A	A
Cresol	C ₆ H ₄ (OH)CH ₃	B	B		B
Crude oil		A	A	B	A
Creosote		C	C	C	C
Cyclo hexane	C ₆ H ₁₂	A	A	B	A
Copper acetate	(CH ₃ COO) ₂ Cu	A	A		A
Detergent solutions		A	A	A	A
Di-benzyl ether	(C ₆ H ₅ CH ₂) ₂ O	C	C	C	C
Diesel oil		A	A	B	A
Dimethyl formamide	HCON(CH ₃) ₂	C	C	C	C
Dioxane		C	C	C	C

MEDIUM	MOLECULA FORMULA	P100	P200	P300	P400
Ethane	C ₂ H ₆	A	A	A	A
Ethyl alcohol(Ethanol)	C ₂ H ₅ OH	A	A	A	A
Ethyl acetate	CH ₃ COOC ₂ H ₅	B	B	B	B
Ethyl chloride	C ₂ H ₅ Cl	B	B	C	B
Ethyl ether	C ₂ H ₅ OC ₂ H ₅	A	A	B	A
Ethylene chloride	(CH ₂ Cl) ₂	C	C	C	C
Ethylene glycol	(CH ₂ OH) ₂	A	A	A	A
Ferric chloride		A	A	A	A
Formaldehyde	HCHO	A	A	A	A
Formic acid 85%	HCOOH	C	C		C
Freon 11	CCl ₃ F	B	B	C	B
Freon 12	CCl ₂ F ₂	A	A	B	A
Fuel A		A	A	B	A
Fuel B		A	A	B	A
Fuel C		A	A	B	A
Gasoline	(CH ₂ OH) ₂ CHOH	A	A	C	A
Glycerine		A	A	A	A
Green sulfate liquor		B	B	B	B
Heptane	C ₇ H ₁₆	A	A	C	A
Hydrochloric acid 20%	HCl	B	B	C	B
Hydrochloric acid 37%	HCl	C	C	C	C
Hydrogen peroxide 3%	H ₂ O ₂	B	B	A	B
Hydrogen peroxide 35%	H ₂ O ₂	C	C	C	C
Isoamyl acetate	CH ₃ COOCH ₂ CH(CH ₃) ₂	C	C	B	C
Isocetane		A	A	B	A
Isopropyl alcohol	(CH ₃) ₂ CHOH	A	A		A
Lactic acid 50%	CH ₃ CHOHCOOH	A	A	A	A
Lime water	Ca(OH) ₂	A	A		A
Lin seed oil		A	A	B	A
Lubricating oil		A	A	B	A
Magnesium sulphate	MgSO ₄	A	A		A
Methyl acetate 97%	CH ₃ COOCH ₃	C	C		C
Methyl acetate 60%	CH ₃ COOCH ₃	C	C		C
Methyl alcohol(Methanol)	CH ₃ OH	A	A	A	A
Mineral oil(ASTM No 1,3)		A	A	B	A
Muriatic acid		C	C	C	C
Naphtha		B	B	B	B
Nitric acid 20%	HNO ₃	C	C	C	C
Nitric acid 40%	HNO ₃	C	C	C	C
Nitric acid 96%	HNO ₃	C	C	C	C
Nitrobenzene	C ₆ H ₅ NO ₂	C	C	C	C
Octane	C ₈ H ₁₈	A	A	C	A
Oleic acid	C ₁₇ H ₃₃ COOH	A	A		A
Oleum		C	C	C	C

THE SYMBOLS USED AS FOLLOWS

A : Suitable for application

B : Suitability depends on Operating conditions

B* : Suitability depends on Operating conditions, Consult JEIL's Technical Team

C : Not Suitable

Chemical Resistance of LEAKBLOK®

A general guide for selection of gasketing material

MEDIUM	MOLECULAR FORMULA	P100	P200	P300	P400
Pentane(C ₅ H ₁₂)	C ₅ H ₁₂	A	A		A
Palmitic acid	C ₁₅ H ₃₁ COOH	A	A		A
Perchloroethylene	C ₂ Cl ₄	B	B	C	B
Petroleum ether		A	A	B	A
Phenol	C ₆ H ₅ OH	C	C	C	C
Phosphoric acid	H ₃ PO ₄	A	A	B	A
Potassium carbonate	K ₂ CO ₃	A	A		A
Potassium chloride	KCl	A	A		A
Potassium chlorate	KClO ₃	A	A		A
Potassium hydroxide	KOH	B	B	C	B
Potassium iodide	KI	A	A		A
Potassium nitrate	KNO ₃	A	A	A	A
Propane	C ₃ H ₈	A	A	B	A
Propylene glycol	CH ₃ CH(OH)CH ₂ OH	A	A		A
Pyridine	C ₅ H ₅ N	C	C	B	C
Sea water		A	A	A	A
Soap		A	A	A	A
Sodium carbonate(Soda)	Na ₂ CO ₃	A	A		A
Sodium aluminate	Na ₃ AlO ₃	A	A		A
Sodium bisulphite	NaHSO ₃	A	A		A
Sodium hydroxide	NaOH	C	C	C	C
Sodium silicate	(WATER GLASS)	A	A	A	A
Sodium sulphate	Na ₂ SO ₄	A	A	A	A
Sodium sulphide	Na ₂ SO ₄	A	A		A
Starch	(C ₆ H ₁₀ O ₅) _x	A	A		A
Steam	H ₂ O	B*	B*	B*	B*
Sulphur dioxide	SO ₂	C	C	B	C
Sulphuric acid(50%)	H ₂ SO ₄	C	C	C	C
Sulphurous acid	H ₂ SO ₃	B	B		B
Tannic acid	C ₇₆ H ₅₂ O ₄₆	A	A	A	A
Tar(Asphalt)		B	B	B	B
Tartaric acid		A	A		A
Tetrachloroethane	C ₂ H ₂ Cl ₄	C	C	C	C
Toluene	C ₆ H ₅ CH ₃	B	B	C	B
Transformer oil		A	A	B	A
Vinyl acetate	CH ₃ COOC ₂ H ₃	A	A	C	A
Water	H ₂ O	A	A	A	A
Xylene	C ₆ H ₄ (CH ₃) ₂	B	B	C	B

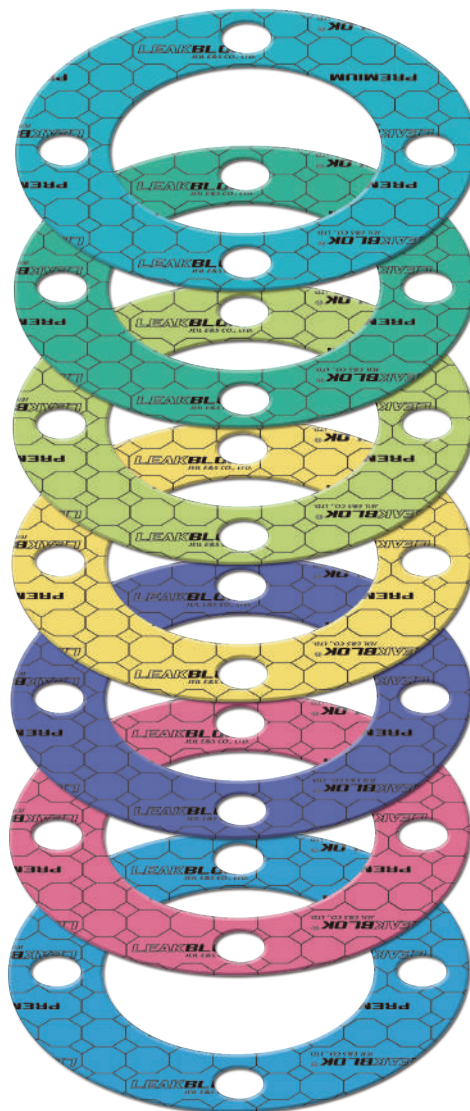
THE SYMBOLS USED AS FOLLOWS

A : Suitable for application

B : Suitability depends on Operating conditions

B* : Suitability depends on Operating conditions, Consult JEIL's Technical Team

C : Not Suitable



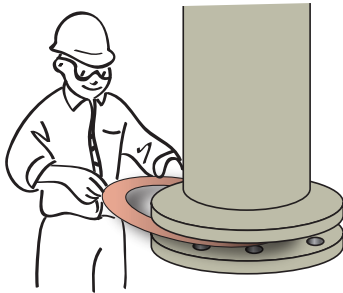
Gasket Handling, Storage & Installation Procedures

1. Gasket Installation

- Make sure that gasket is correctly chosen for specific size and material.
- Examine the gasket to assure free of defects.
- Carefully install the gasket between the flange.
- The gasket has to be centralized in the flange.
- Ensure the gasket has not pinched or damaged when install the gasket.

1. 가스켓 장착

- 가스켓이 지정된 사이즈와 재료로 제작되었는지 확인한다.
- 가스켓의 결함 여부를 확인한다.
- 플랜지 사이에 가스켓을 조심스럽게 끼운다.
- 가스켓이 플랜지 센터 부분에 위치했는지 확인한다.
- 가스켓이 잘못 끼워지거나 손상되지 않도록 확인하면서 플랜지를 장착한다.

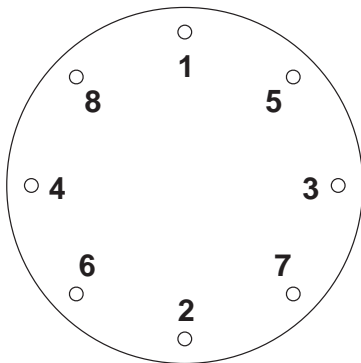


2. Bolt Tightening Instruction

- Required to use proper tools, calibrated torque wrench or other controlled tensioning device.
- For guidance of torque, consult with gasket manufacture.
- Bolt tightening should be in a cross-wise with correct torque.

2. 볼트 체결 방법 및 순서

- 항상 적절한 기구를 사용한다.
- 토크 지침 안내에 관해서는 가스켓 제조업체와 상의한다.
- 볼트 조임시 항상 대각선 방향 순서로 한다.

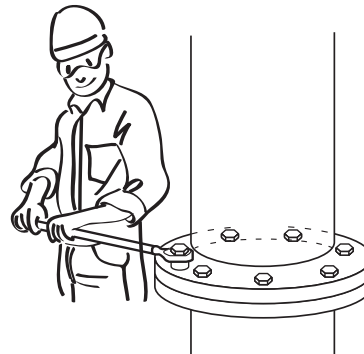


3. Tighten the nuts in multiple steps

- Tighten all nuts initially by hand (Larger bolts may require a small hand wrench)
- Torque each nut to ~30% of full torque
- Torque each nut to ~60% of full torque
- Torque each nut full torque, again still using the cross bolt tightening pattern (larger diameter flanges may require additional tightening passes)
- Apply at least one final torque to all nuts in a clockwise direction until all torque is uniform (Larger diameter flanges may require additional passes)

3. 볼트/너트 조임 단계

- 모든 너트를 처음에는 손으로 조인다. (큰 볼트는 작은 핸드렌치를 사용할 수 있다.)
- 30%까지 각 너트를 조인다.
- 60%까지 각 너트를 조인다.
- 대각선 순서로 완전히 너트를 조인다. (대구경 플랜지는 추가로 조임을 준다.)
- 모든 토크가 균일하게 될 때까지 시계방향으로 볼트를 최종적으로 조인다.



4. Re-Tightening

- Caution - Consult your gasket manufacture for guidance and recommendations re-tightening.
- Do Not Re-torque elastomer-based, non-asbestos gaskets after they have been exposed to elevated temperature unless otherwise specified.
- Re-torque fasteners exposed to aggressive thermal cycling.
- All re-torquing should be performed at ambient temperature and atmospheric pressure.

4. 재조임

- 주의 - 재조임에 관한 안내 및 유의사항에 관해서는 가스켓 제조업체와 상의한다.
- 달리 규정되어 있지 않으면 상승된 온도에 노출된 후에는 고무가 함유된 비석면 가스켓은 재조임을 하지 않는다.
- 심각한 열변화에 노출된 조임부분은 재조임을 한다.
- 모든 재조임은 대기온도 및 대기압에서 이루어져야 한다.

5. Storage

- Avoid expose to direct sunlight, storage in cool, dark and clean place.
- Recommended temperature (below 25°C)
- Recommended humidity level (under 60%)
- First-in & First-Out, storage in flat condition without folding.

5. 보관

- 직사광선을 피하고, 서늘하고, 어둡고, 깨끗한 장소에 보관 한다.
- 보관 권장 온도는 25°C 이하
- 보관 권장 습도는 60%
- 선입 선출 사용 권장 하며 수평으로 보관한다.

The Theory of Evolution at Soft Gasket Materials!!

1890's

1950's

From 2013



Asbestos
Gasket Materials



Non-Asbestos
Gasket Materials



Eco friendly
LEAKBLOK® series



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