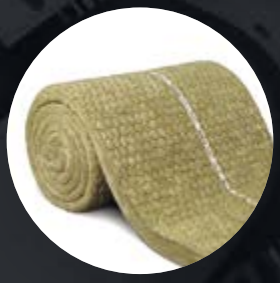
A CLOSER LOOK AT MINIMISING CUI

OUTSTANDING WATER-REPELLENT PRODUCT PROPERTIES FOR ALL INDUSTRIAL APPLICATIONS



REDUCE MAINTENANCE, SHUTDOWN TIMES, RISK OF LEAKAGES AND PERSONAL INJURY:

- Very low water absorption: ≤ 0.1 kg/m² according to EN1609/EN13472/24h*
- Suitable for painting operations (certified according to VDMA24364)
- Maximum content of water-soluble chloride ions (Cl-) ≤ 10 ppm (meeting AGI Q132 requirements)
- Short dry-out time
- Elevated temperature range

FULL RANGE OF PRODUCTS:

- Pipe sections and elbows, slabs, mats and wired mats for all industrial installations

NON-CONTACT SOLUTION AVAILABLE

OUTSTANDING WATER REPELLENCY*

*Internal water repellent testing, March 2020

OWENS CORNING® PAROC®

MINIMISE THE RISK OF CORROSION UNDER INSULATION (CUI) WITH WATER-REPELLENT INSULATION SOLUTIONS

LOW WATER ABSORPTION

One of the biggest challenges in insulating industrial applications is the prevention of corrosion under insulation (CUI). The consequences of CUI can be costly as they can lead to additional inspections and higher operating and maintenance costs[1]. CUI can cause longer downtimes, a shorter service life for pipes, risk of leakages and systems and – in the worst case – even result in personal injury.

INSULATION PERFORMS BEST WHEN IT REMAINS DRY

Corrosion under insulation can cause steel piping and process industry equipment to deteriorate under externally clad or jacketed insulation. It may be caused by the penetration of water or moisture due to condensation when the wrong insulation system has been chosen, or the installation has not been prepared, fitted and finished properly.

As industrial insulation solutions frequently risk exposure to water, high humidity, or other liquids, low water absorption is a vital product property.

YOUR SOLUTION TO REDUCE THE RISK OF CORROSION

When austenitic stainless-steel surfaces are exposed to a corrosive environment and tensile stresses, stress corrosion cracking (SCC) can occur. To minimise stress corrosion cracking under the insulation, the insulating materials must meet high acceptance criteria: Chloride ion content should should fit into a specific diagram (ASTM C795).

Choosing a highly water-repellent, non-hygroscopic, chemically robust and durable insulation solution is key to protecting the insulated surfaces from moisture and other harmful substances.

REMARKABLE LOW WATER ABSORPTION PROPERTIES

FOR STONE WOOL INSULATION

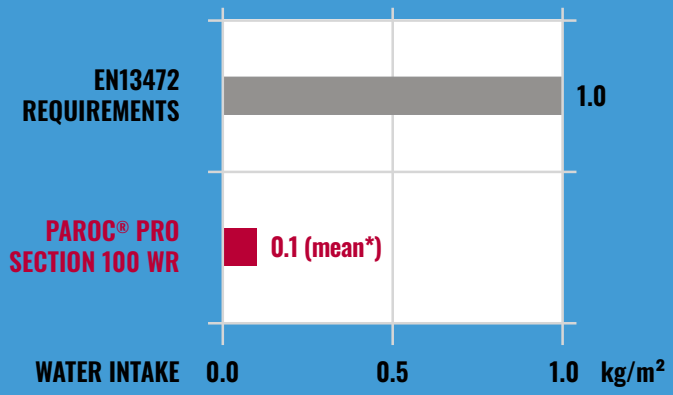
PAROC's water-repellent (WR) stone wool products are an excellent choice for meeting all these technical requirements. They have outstanding hydrophobic properties, reducing the risk of water getting trapped within the insulation material. The open-pore structure ensures a faster dry-out time, allowing bulk water to drain away and vapor to dry naturally. This provides unparalleled, effective protection and reduced moisture absorption over the entire thickness of the insulation.

Independent test laboratories[2] have confirmed that PAROC PRO WR products have significantly lower water absorption properties, offering an average water absorption that is more than 10 x better than the toughest requirements on the market when tested in compliance with EN1609 and EN13472/24h[2]. In fact, it absorbs on average less than 0.1 kg/m² water after being heated to 300°C for 24h.

Broad product portfolio with water-repellent (WR) properties

We prioritize the safety of industrial operations, the productivity of your processes, and the preservation of our environment. Therefore, PAROC offers a product range of fast, and easy-to-install WR solutions for all types of applications – including a full product range of pipe sections and elbow solutions, wired mats, mats and slabs. In addition, our WR products are safe for painting applications and certified to the requirements of the VDMA 24364 coating standard.

[1] A 2003 ExxonMobil study found that 40–60% of maintenance costs on industrial pipes is caused by CUI.
[2] 2The data is based on an independent third-party comparison of products from the most important mineral wool manufacturers, which was carried out by Eurofins Lab 19036 on 16 August 2019.



OUTSTANDING WATER ABSORPTION PROPERTIES FOR STONE WOOL INSULATION[2]

10 TIMES BETTER THAT THE REQUIREMENTS OF THE TOUGHEST KNOWN STANDARD AVAILABLE (EN13472)*, EVEN AFTER BEING EXPOSED TO TEMPERATURES UP TO 300 °C*

** average water absorption level <0,1 kg/m² after 300 °C/24h prebake; based on 3rd party testing in 2019 and internal testing in 2023 and 2024*

FULL PRODUCT RANGE

The extensive range of PAROC PRO products cover most required insulation solutions: pipe sections and elbow solutions, slabs, mats, and wired mats for most industrial installations – a non-contact solution is also available. Our exact product dimensioning reduces installation time and increases efficiency.

Non-contact insulation with PAROC® CUI Spacers
A non-contact insulation is considered one of the best solutions for reducing the risk of CUI. PAROC® CUI Spacers are silicone spacer blocks suitable for high-temperature environments and can be attached to a PTFE belt (PAROC® CUI Belt). The PAROC spacer system offers a number of advantages: The solution can be easily modified to fit most pipe diameters and can be used on equipment and irregular shapes as well (one size fits all). The solution is non-metallic with no risk of damaging the surface protection. The spacers can be installed with a minimum of tools. A pair of scissors or a knife is all that's needed. No waste. All excess material can be fitted to the next application.

[1] A 2003 ExxonMobil study found that 40–60% of maintenance costs on industrial pipes is caused by CUI.
[2] 2The data is based on an independent third-party comparison of products from the most important mineral wool manufacturers, which was carried out by Eurofins Lab 19036 on 16 August 2019.

WHY PAROC WR PRODUCTS ARE EXCELLENT TO MINIMIZE THE RISK OF CUI

- **Outstanding water absorption properties[2]**
  PAROC Pro WR products have outstanding water absorption properties; third-party tests prove that they are more than 10 x better on average than the toughest requirements when tested in compliance with EN1609 and EN13472[2].

- **Faster dry-out**
  A shorter drying time can reduce the critical period when damp insulation can create a corrosive environment between the pipe and the insulation. This is possible due to the excellent water repellency and the fibrous, open-pored structure of stone wool, which enables water to drain away and vapor to dry out.

- **Help prevent corrosion**
  The PAROC WR products contain very low levels of water-leachable chlorides and are non-acidic. This can effectively help to avoid different kinds of corrosion, including stress corrosion cracking of stainless steel.

- **Higher efficiency**
  Our products are designed to endure harsh environments, maintaining their water repellent capabilities at temperatures up to 300°C[2]. This ensures smooth operations, CUI protection and maximum efficiency in high-temperature industrial applications.

NON-CONTACT INSULATION TO MINIMISE THE RISK OF CUI:

HOW TO KEEP WATER AWAY FROM THE PIPE SURFACE?

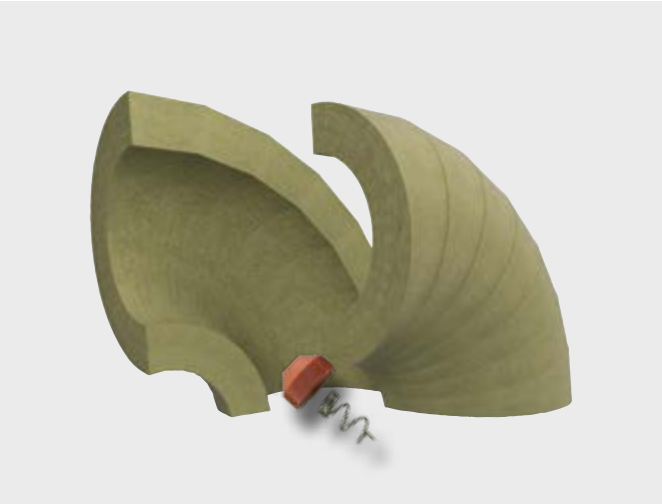
When it comes to CUI, elbows are often seen as a weak point in the insulation system. Fortunately there is a solution for this problem: **PAROC® Pro Curve (WR)** and **PAROC® CUI Spacers** form a strong alliance that reduces the risk of CUI and saves valuable installation time.

PAROC® CUI Spacers can be considered as one of the best solutions maintaining the distance between pipe and stonewool pipe insulation. Compared to other solutions on the market they offer a range of advantages, e. g. minimal waste (as cut off material material can be easily attached to next belt, only one product size (stock one size that will fit all dimensions), flexible, non-metallic..

PAROC® Pro Curve (WR) products are delivered in two halves enabling an installation that is much faster than standard products. PAROC® Pro Curve is available in 100, 120 and 140 kg/m³:

- PAROC® Pro Curve (WR) 100
- PAROC® Pro Curve (WR) 120
- PAROC® Pro Curve (WR) 140

Thickness in mm	Available dimensions PAROC® Pro Curve (WR)						
	114	140	168	219	273	324	356
30	180	206	232	284	336	388	414
40	193	219	245	297	349	401	440
50	219	245	271	323	375	427	453
60		258	284	336	388	440	479
70		284	310	362	414	466	492
80			323	375	427	479	518
90			349	401	453	505	531
100			362	414	479	518	557
120			414				596



http://impact.nace.org/documents/ccsupp.pdf

REDUCE MAINTENANCE, SHUTDOWN TIMES, RISK OF LEAKAGES AND PERSONAL INJURY:

- **Very low water absorption: average of 0.1 kg/m² (according to EN 1609 / EN13472/24h)**
- **Safe during painting operations (certified according to VDMA24364)**
- **Maximum content of water-soluble chloride ions (Cl-) ≤ 10 ppm (meeting AGI Q132 requirements)**
- **Short dry-out time**
- **Elevated temperature range**

FULL RANGE OF PRODUCTS:

- **Pipe sections and elbows, slabs, mats and wired mats for all industrial installations**

NON-CONTACT SOLUTION FOR PIPES AVAILABLE

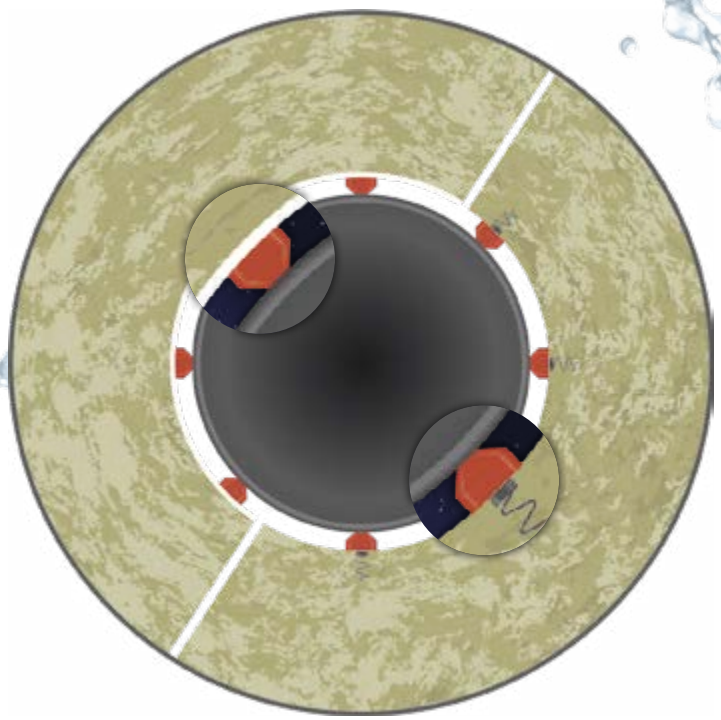
PAROC® CUI SPACERS

PAROC® CUI Belt is a PTFE ring qualified for high-temperature environment, tailored to accommodate and align PAROC® CUI Spacers around a pipe. Together, these constitute an elegant solution for minimizing corrosion under insulation. PAROC® CUI Belt acts as support structure for PAROC® CUI Spacers, facilitating easy installation and a minimum 13 mm air gap between the insulation material and the pipe surface, allowing moisture to dry out and leading water away from the pipe surface. For dimensioning guidance, please refer to the separate dimensioning guide.

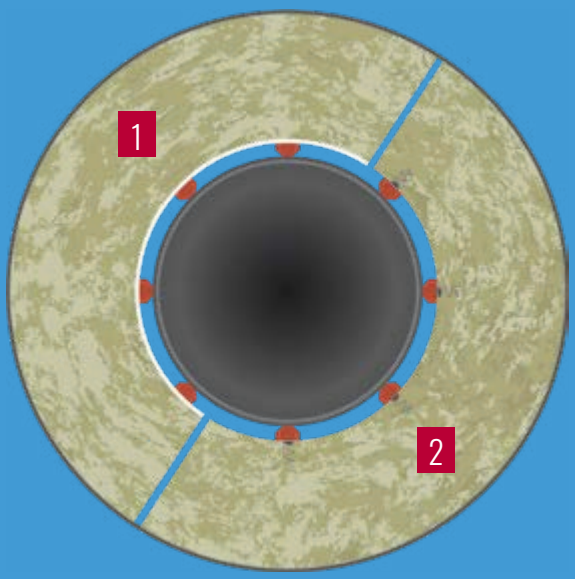
PAROC® CUI Spacer is a silicone distance block qualified for high-temperature environment, placed on a PTFE belt (PAROC® CUI Belt). Together, these constitute an elegant solution for minimizing corrosion under insulation.

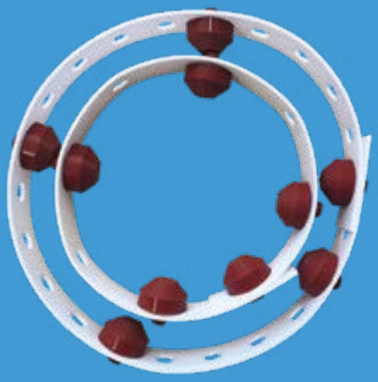
PAROC® CUI Spacer is made of a high-temperature and high performance silicone material creating a minimum 13 mm air gap between the insulation material and the pipe surface, allowing moisture to dry out and leading water away from the pipe surface. For dimensioning guidance, please refer to the separate dimensioning guide.

PAROC® CUI Spacers and Belts can be used in systems with a continuous temperature up to 200 °C, with peak temperatures up to 230 °C. One size fits all pipe dimensions, allowing easy installation. The minimum 13 mm airgap even provides space for electrical tracing, as well as moisture, water accumulation, or corrosion detection systems.



INSTALLATION AND INSTRUCTIONS FOR PAROC® CUI SPACERS





Option 1: Mounted on a belt
Recommended for pipes >30 mm diameter

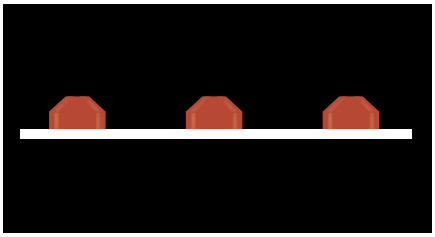
Option 2: Single spacers with springs
recommended for pipes with ≤30 mm diameter and smaller areas of insulation (e. g. inspection hatches) as well as pipe elbows

ADVANTAGES OF PAROC® CUI SPACERS:

- **No tools required for installation**
- **One size fits all; only one size needs to be stocked**
- **Easy and fast installation**
- **Provides space for electrical tracing**
- **No sharp edges**
- **Temperature range up to 200 °C**

INSTALLATION OF PAROC® CUI SPACERS

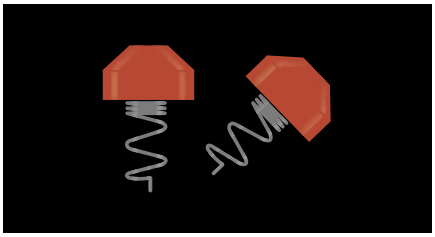
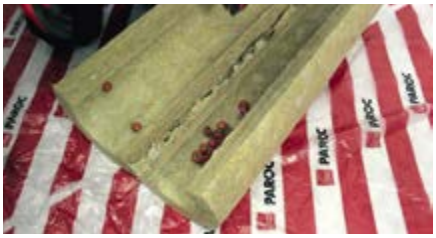
***1**. Spacers mounted on a belt*








***2**. Single spacers with springs*



BELT LENGTH/NEEDED NUMBER OF SPACERS (RECOMMENDATIONS)

Nominal pipe size inch		Pipe Section inner diameter without spacers	Nominal diameter	Pipe Section inner diameter with spacers	Belt length single mm	Number of spacers for single belt	Belts per pipe section		Belts per pipe section	
A	B	C	D	E	F	G	Belt mm	Spacers pcs	Belt mm	Spacers pcs
							3		4	
1/4	13,70	15	43	48	195	3	585	9		
3/8	17,10	18	46	48	204	3	613	9		
1/2	21,30	22	50	54	217	3	651	9		
3/4	26,70	28	56	57	236	3	708	9		
1	33,40	35	63	64	258	3	773	9		
1,25	42,20	42	70	70	280	3	839	9		
1,5	48,30	48	76	76	299	4	896	12		
		54	82	84	317	4	952	12		
		57	85	89	327	4	981	12		
2	60,30	60	88	89	336	4	1009	12		
		64	92	102	349	4	1047	12		
		70	98	102	368	4	1103	12		
		76	104	108	387	5	1160	15		
		84	112	121	412	5	1235	15		
3	88,90	89	117	121	427	5	1282	15		
3,5	101,60	102	130	133	468	5	1405	15		
		108	136	140	487	5	1461	15		
4	114,30	114	142	151	506	6	1518	18		
		121	149	151	528	6	1584	18		
		127	155	156	547	6	1640	18		
		133	161	162	566	6	1697	18		
5	141,30	140	168	168	588	6	1763	18		
		156	184	194	638	7	1913	21		
		159	187	194	647	7	1942	21		
		162	190	194	657	7	1970	21		
6	168,30	168	196	208	675	7	2026	21		
		194	222	230	757	8	2271	24		
		208	236	240	801	8	2403	24		
8	219,10	219	247	259	836	8	2507	24		
		230	258	259	870	8	2610	24		
		240	268	273	902	9	2705	27		
		245	273	273	917	9	2752	27		
		259	287	289	961	9	2884	27		
10	273,10	273	301	305	1005	10	3015	30		
		289	317	324	1055	10	3166	30		
		295	323	324	1074	10	3223	30		
		305	333	356	1106	10	3317	30		
12	323,90	324	352	356	1165	11	3496	33		
14	355,60	356	384	406	1266	12	3797	36		
		371	399	406	1313	12	3939	36		
		377	405	406	1332	12	3995	36		
16	406,40	406	434	457	1423	13	4268	39		
		426	454	457	1486	13	4457	39		
18	457,20	457	485	490	1583	14			6332	56
		479	507	508	1652	15			6608	60
		490	518	533	1687	15			6746	60
20	508,00	508	536	558	1743	15			6972	60
		533	561	612	1822	16			7286	64
		558	586	612	1900	17			7600	68
24	610,00	612	640	665	2070	18			8278	72
		630	658	665	2126	19			8504	76
28	711,20	714	742	762	2390	21			9560	84
30	762,00	762	790	813	2541	22			10162	88

PAROC® CALCULUS:
DESIGN ENERGY-EFFICIENT INSULATION TAILORED TO YOUR PROJECT

PAROC® Calculus is a technical insulation calculation program for dimensioning thermal insulation for different HVAC and Process Industry applications e.g. pipes, ventilation ducts and process industry tanks. With PAROC® Calculus it is also possible to calculate the heat loss for insulated and uninsulated valves and flanges, which usually increases the risk of heat loss. Additionally, the heat loss caused by thermal bridges in pipe and duct suspensions can be taken into account.

With PAROC® Calculus you can design energy efficient and economical insulation solutions for different HVAC and process industry applications with PAROC products.

PAROC® Calculus features:

Updated according to ISO 12241:2022

- Easy to use interface
- Works on pc, tablets and mobile phones
- Calculations for heat loss, surface temperature and temperature drop in pipes, ventilation ducts, process industry tanks, valves and flanges.
- Easy input of pipe diameters and duct dimensions (predefined)
- Thermal bridges of pipe and duct suspensions
- Print out your calculations to pdf
- All calculations are based on equations described in the EN ISO 12241 standard.

Select application

Calculate with surface temperature display - cladding systems, suspensions and substructures can optionally be used for the calculation

This software (the Service) calculates properties of insulation solutions made by PAROC Technical Insulation products. Calculations are based on standard ISO 12241. The latest version is always on Paroc web pages. The information contained in the online insulation, energy and CO_2 calculations (the Service) is provided in good faith and for general information purpose only. Owens Corning as well as any of its direct or indirect affiliates, including Paroc Group OY (individually and jointly "Owens Corning") assumes no responsibility for errors or omissions in the contents of the Service, including technical or product data, product recommendations, research information, data and/or content contained in the Service. In providing the Service, Owens Corning does not make any warranties about its completeness, its reliability and its accuracy. Any action you take upon the information you find in using the Service, is strictly at your own risk. In no event shall Owens Corning be liable for any special, direct, indirect, consequential, or incidental damages or any other damages whatsoever, whether in an action of contract, negligence or other tort, arising out of or in connection with the use of the Service or the contents of the Service. Owens Corning reserves the right to make additions, deletions, or modification to the contents on the Service at any time without prior notice. By using the Service, you hereby consent to the present disclaimer and agree to its terms.

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09/2024
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