

RE/WRAP REMOVABLE & REUSABLE INSULATION SYSTEM



SERVICE-PROVEN TO SATISFY ALL OF THE NEEDS OF POWER AND PROCESS INDUSTRY OPERATORS

When pipes, fittings and equipment in hydrocarbon or power and process systems undergo periodic inspection or maintenance, the insulation on these systems must be removed.

After inspection, that insulation has to be reinstalled – or the extra heat loss will result in the waste of large amounts of costly energy, may adversely affect the process, and can present serious personnel hazards.

PCI's RE/WRAP Insulation System is the cost-effective solution to this problem. High thermal efficiency,

resistance to high temperatures and corrosion, ease of removal and reinstallation, and competitive cost combine in an engineered insulation system built to withstand many years of dependable service and many removal reinstallation cycles.

PCI's RE/WRAP Insulation System is based on a design concept developed for a wide range of applications over many years of close evaluation of power and hydrocarbon processing industry requirements and specifications. It is a completely engineered system, custom-designed in single or double layer to fit the process or power piping system to which it is applied.

WHAT IS THE RE/WRAP SYSTEM?

PCI RE/WRAP Insulation System is designed around a flexible blanket of resilient high-temperature insulation encased in an outer covering of high-temperature woven fibrous glass fabric. It is secured in place over piping, fittings and equipment with Velcro® hook-and-loop fasteners. Outer covering materials are sewn together using glass fiber or other high-integrity thread to encase the insulation blankets. A selection of flexible covering materials is available to meet various service conditions.

RE/WRAP insulation covers for elbows, flanges, valves, pumps, turbines, manways and other equipment are engineered for an exact fit to customers' particular requirements.

RE/WRAP insulation components are available for straight runs of piping in a full range of iron pipe sizes.

WHERE AND HOW CAN THE RE/WRAP INSULATION SYSTEM BE USED?

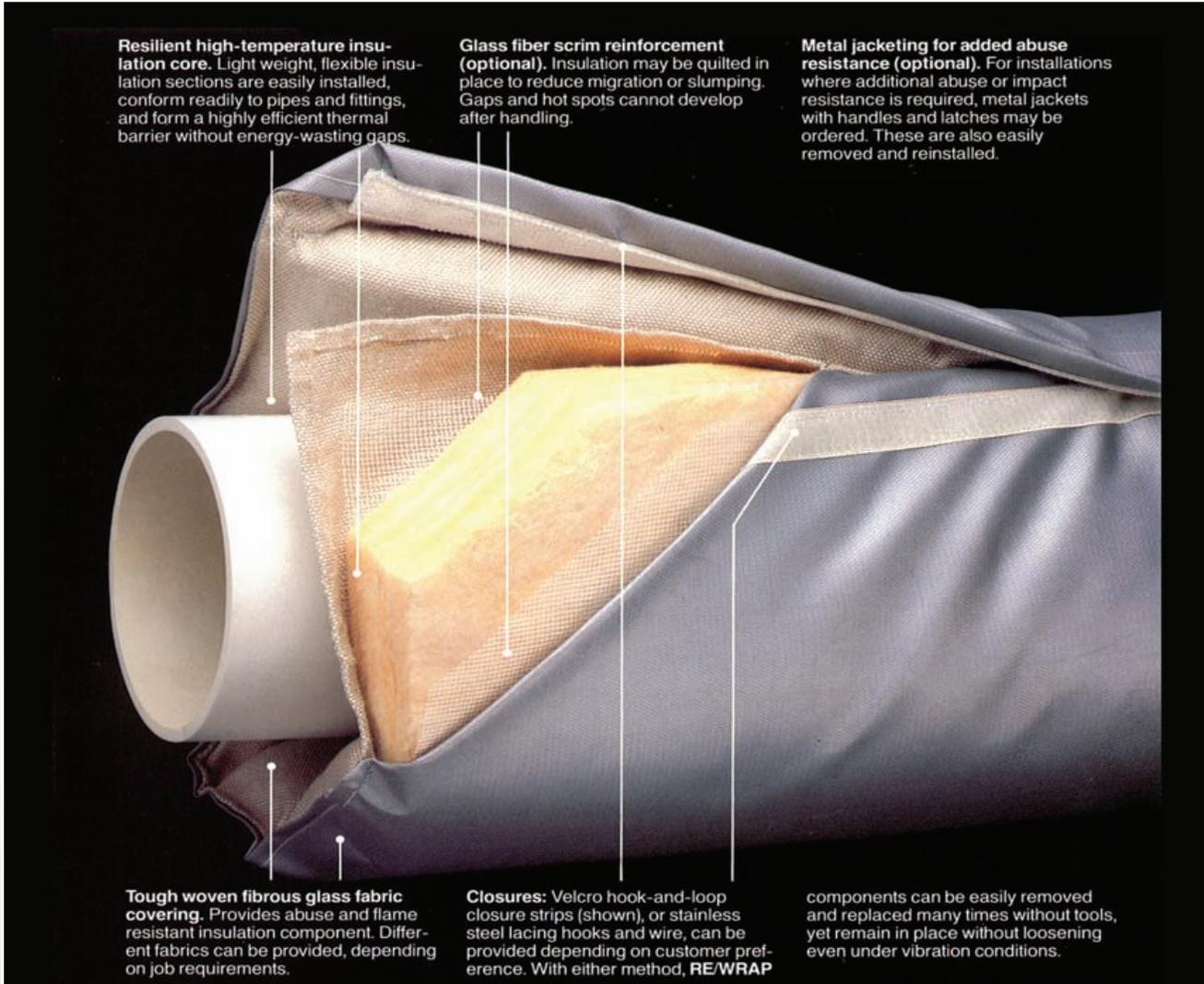
Owens-Coming's RE/WRAP Insulation System is designed to provide rapidly removable and reusable, highly effective thermal insulation as a total system including pipe, fitting and equipment covers. It may also be installed to provide easy access to locations requiring in-service inspection or maintenance, indoors or out, in combination with standard insulation applied where removability is not required.

RE/WRAP insulation sections can either be designed to meet individual user requirements, or supplied as commodity items for customer installation on standard piping and equipment. The system is easily installed, requiring no special skills, tools, or techniques to achieve a neat and efficient insulation job without energy wasting gaps between sections.



RE/WRAP Insulation blanket is applied over flanges in power plant ash-handling system where frequent service is required. Blankets are quickly removed when flanges require periodic maintenance, and can just as quickly be replaced. Adjacent piping, not requiring periodic maintenance, is covered with conventional insulation and aluminum jacketing. The system normally operates at 250°F but may experience temperature excursions above 600°F.

A LOOK INSIDE THE RE/WRAP INSULATION BLANKET



STANDARD PCI RE/WRAP INSULATION SYSTEMS

Standard PCI RE/WRAP blankets and fitting covers have insulation cores of Owens-Corning TIW Type II Thermal Insulating Wool, a light-density Fiberglas® insulation capable of withstanding operating temperatures to 1000°F. Coverings are of woven fibrous glass fabric, coated or uncoated depending on service requirements as described above.

RE/WRAP 500 -

For general purpose service at operating temperatures not exceeding 500°F, and where excellent oil and water resistance are required. Inside and outside coverings are of silicone coated woven fibrous glass fabric.

RE/WRAP 1000 -

For general purpose service at operating temperatures not exceeding 1000°F. Inside covering material is uncoated woven fibrous glass fabric. Insulation core may thus absorb some moisture, but its thermal efficiency will be restored after drying out. Exterior covering material may be either uncoated or silicone coated woven fibrous glass fabric; the latter provides excellent resistance to water and provides good resistance to various chemicals. It is advised that PCI be consulted for design of RE/WRAP systems to meet particular chemical and temperature exposure requirements.

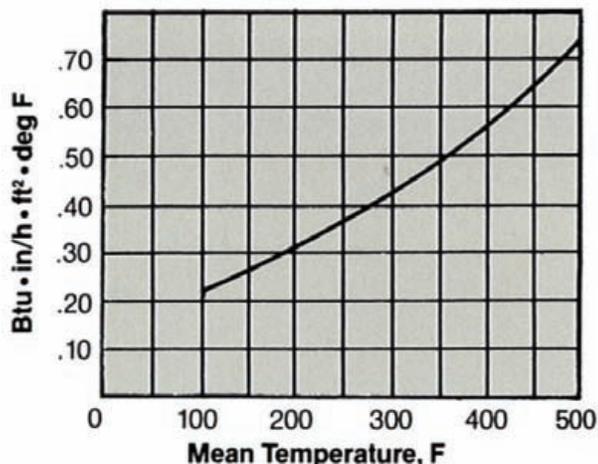
STANDARD PCI RE/WRAP INSULATION SYSTEMS

THERMAL CONDUCTIVITY OF INSULATION

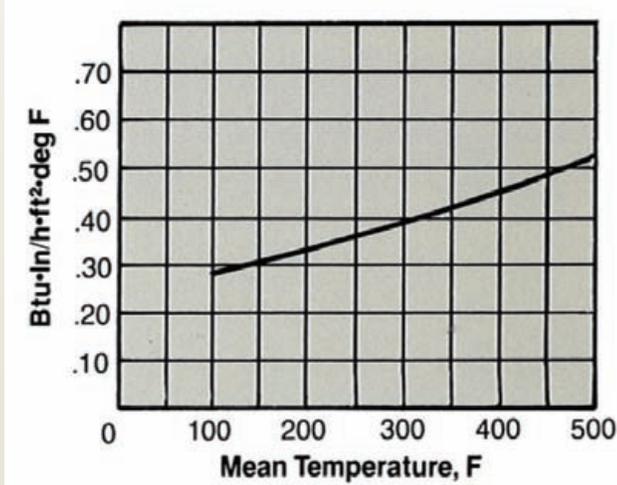
These curves were generated in accordance with ASTM C177, flat surface.

Overall product maximum operating temperature capability may be limited by the covering material specified, and not by the insulation.

Fibrous Glass Wool



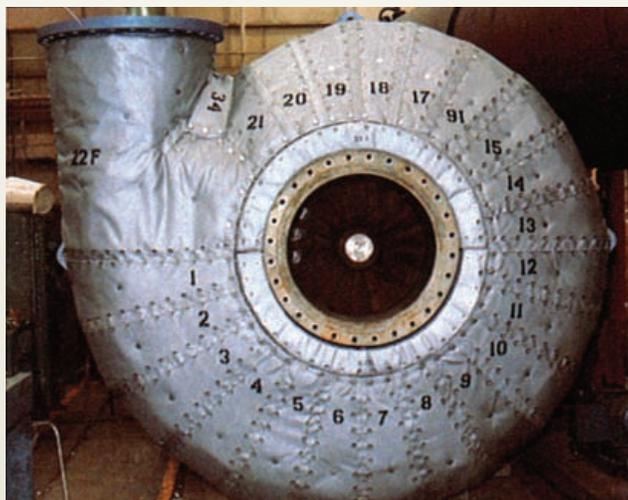
Needles Glass Mat



TYPICAL PHYSICAL PROPERTIES OF STANDARD COMPONENTS*

- Thickness (standard): 1", 2", 3"
(For greater thickness contact PCI for availability.)
- Moisture adsorption by volume, insulation only
ASTM C 553: Less than 0.2% (insulation material only.)
- Non-Corrosiveness meets requirements of MIL-I-24244B Amend. 1. (If specification compliance is a job requirement, notify PCI when ordering. We can supply required documentation.)
- Surface burning characteristics (ASTM E84): flame spread 25 while smoke developed 50.

*This standard is used solely to measure and describe the properties of the products in response to heat and flame under controlled laboratory conditions. This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions. Values are reported to the nearest 5 rating.



Custom RE/WRAP blankets cover 98% of the sound generating area of this air compressor convolute scroll, inlet nozzle and back plate, achieving a sound attention of 12 to 15 dB over a wide range of frequency levels.

CUSTOM RE/WRAP INSULATION SYSTEMS

PCI RE/WRAP removable/reusable insulation system components can be supplied to meet a variety of technical performance requirements when project needs surpass the application limitations of standard RE/WRAP products. Among these:

RE/WRAP HIGH TEMPERATURE INSULATION SYSTEMS –

Service temperatures in excess of 1000°F are attainable, with or without resistance to absorption of hot fluids depending on job requirements.

RE/WRAP WEATHER RESISTANT INSULATION SYSTEM –

Outer covering and jacketing materials may be specified to provide systems that resist long-term exposure to weather as well as to certain chemicals.

RE/WRAP FIRE ENDURANCE INSULATION SYSTEMS –

For installation on equipment requiring thermal protection from a hydrocarbon fire for one hour or more. PCI can manufacture and install a pre-engineered RE/WRAP system in accordance with designs that have been proven by testing to be capable of withstanding a 2000°F fire per UL 1709.

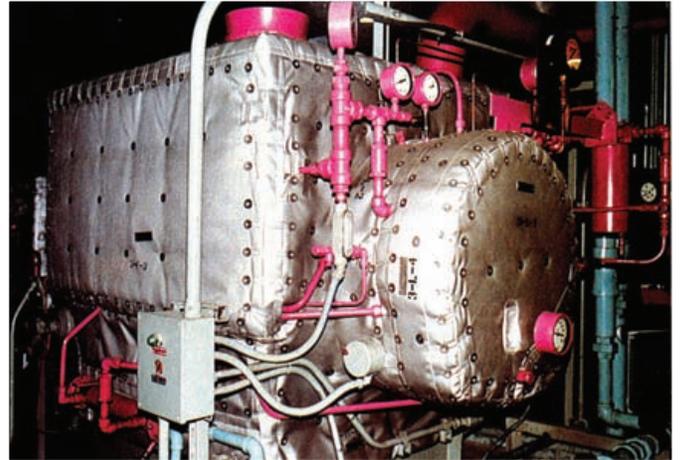
RE/WRAP ACOUSTICAL INSULATION SYSTEMS –

To reduce worker exposure to high ambient noise levels in the vicinity of noisy equipment such as compressors or jet pumps, PCI can provide RE/WRAP acoustical barriers and noise absorbing systems. The noise reduction requirements of the particular job dictate the design, material selection and thickness of RE/WRAP systems for noise control application.

RE/WRAP FORMFIT™ INSULATION SYSTEMS –

These are semi-rigid removable and reusable coverings tailored for a snug fit over valves, flanges and other kinds of fittings. Their construction provides good abuse and damage resistance. FORMFIT™ removable/ reusable insulation components can be custom designed for a snug fit over non-standard fittings or special equipment configurations.

Materials used in these RE/WRAP systems are selected on the basis of tests conducted under actual exposure conditions to assure system durability and requisite thermal or acoustical performance. The customer is thus assured that the RE/WRAP system recommended and engineered by PCI for the particular project will perform as specified.



RE/WRAP acoustical blankets are effective in controlling industrial noise and helping ensure compliance with OSHA noise exposure limits. Here RE/WRAP blankets muffle sound generated by large compressor.

RE/WRAP FORMFIT custom enclosure. Equipment of almost any size and shape can be accommodated by a custom design.



When specified for added impact and abuse resistance, RE/WRAP insulation components can be supplied with metal jackets having quick release latches to make removal and reinstallation fast and easy. In the case of this component, RE/WRAP insulation blankets have been permanently affixed within the metal jacket; a single operation takes care of removal or reinstallation of both jacket and insulation as one unit.

RE/WRAP INSULATION SYSTEMS COST/BENEFIT ANALYSIS

HEAT LOSS AND SURFACE TEMPERATURE DATA FOR PIPING AND EQUIPMENT INSULATED WITH RE/WRAP REMOVABLE/REUSABLE INSULATION: Straight pipe heat loss in Btu/hr·ft (horizontal), 80°F ambient, 0 mph wind velocity, 0.9 surface emittance, 0.85 bare pipe emittance

PCI's RE/WRAP Removable/Reusable Insulation Systems can save you money and recover their costs in many ways:

1. Through heat conservation. For example, heat loss through a single 6", 150-lb. gate valve operating at 600°F (assuming 70°F ambient, 5 mph wind) is calculated at close to 20,000 Btu per hour. That is the equivalent of heating with about 1,800 gallons of No.2 fuel oil a year-substantially more than the cost of a standard RE/WRAP 6" valve cover.

2. Through personnel protection. The risk of serious injury is always present when workers are in the vicinity of high-temperature piping and equipment. A single lost-time injury could cost a great deal more than a single RE/WRAP removable/reusable insulation cover.

3. Through removability and replaceability. Compared to the cost of ripping off, then replacing conventional insulation, a RE/WRAP system could easily pay for itself after just one removal and replacement cycle- and save its cost again each time the maintenance operation is performed. PCI can provide a cost-benefit analysis for a RE/WRAP removable/reusable insulation system meeting your specific job requirements. This analysis can show you how quickly the system can pay for itself, and how much labor and energy cost you might expect to save over the RE/WRAP system life cycle

The data in the table (right) were calculated using ASTM C680 "Recommended Practice for Determination of Heat Loss or Gain, and Surface Temperatures of Insulated Pipes and Equipment," for standard PCI RE/WRAP® systems with fibrous glass wool or needled glass mat as the thermal insulation medium. Other RE/WRAP designs yield different heat loss values for the same thickness.

NOM. PIPE SIZE	THICKNESS	FIBROUS GLASS WOOL						NEEDED GLASS MAT			
		200F		400F		600F		800F*		1000F*	
		HEAT LOSS	SURF TEMP	HEAT LOSS	SURF TEMP	HEAT LOSS	SURF TEMP	HEAT LOSS	SURF TEMP	HEAT LOSS	SURF TEMP
2" NPS	BARE	181		710		1593		2984		5078	
	1.0"	23	92	86	119	196	158	247	183	380	224
	2.0"	15	86	56	100	127	120	163	134	250	157
	3.0"	12	84	45	93	103	107	131	116	201	132
4" NPS	BARE	324		1279		2899		5476		9385	
	1.0"	38	94	141	124	321	167	417	196	642	241
	2.0"	24	87	88	103	199	128	257	143	394	170
	3.0"	18	84	67	95	151	112	198	123	303	141
6" NPS	BARE	461		1830		4171		7920		13626	
	1.0"	56	96	205	129	466	177	584	203	899	250
	2.0"	32	88	118	105	267	132	347	149	532	177
	3.0"	24	85	88	97	201	115	261	127	399	147
8" NPS	BARE	587		2338		5350		10192		17580	
	1.0"	67	95	246	128	559	175	750	207	1155	255
	2.0"	40	88	145	107	330	134	435	152	668	182
	3.0"	29	85	105	97	237	116	322	130	493	151
10" NPS	BARE	719		2870		6588		12585		21754	
	1.0"	85	96	314	132	716	182	915	210	1409	259
	2.0"	47	88	171	107	387	135	524	155	803	185
	3.0"	34	85	126	98	286	118	383	132	586	154
12" NPS	BARE	841		3366		7744		14822		25663	
	1.0"	91	95	333	128	758	175	1079	212	1663	262
	2.0"	54	88	197	107	448	136	611	157	938	188
	3.0"	40	86	145	99	329	119	443	133	678	156
14" NPS	BARE	917		3673		8462		16215		28097	
	1.0"	109	97	400	133	912	185	1243	214	1917	265
	2.0"	62	89	225	109	511	140	699	158	1072	190
	3.0"	44	86	162	100	367	121	503	135	770	158
16" NPS	BARE	1037		4161		9605		18434		31981	
	1.0"	123	97	453	134	1032	186	1407	216	2170	267
	2.0"	69	89	253	110	575	141	786	159	1206	192
	3.0"	50	86	181	100	410	122	563	136	862	160
18" NPS	BARE	1157		4646		10742		20644		35852	
	1.0"	138	97	506	135	1152	187	1571	217	2422	268
	2.0"	77	89	281	110	638	142	873	160	1340	193
	3.0"	55	86	200	101	454	123	622	137	953	161
20" NPS	BARE	1275		5128		11874		22846		39714	
	1.0"	152	97	559	135	1272	188	1735	218	2675	270
	2.0"	85	89	310	111	702	142	960	161	1474	194
	3.0"	60	86	220	101	498	124	682	137	1045	162
24" NPS	BARE	1510		6084		14124		27231		47409	
	1.0"	181	98	664	136	1512	190	2063	219	3181	271
	2.0"	100	90	366	111	829	144	1135	162	1742	196
	3.0"	71	86	258	102	584	125	801	138	1228	163
30" NPS	BARE	1857		7504		17471		33768		58899	
	1.0"	224	98	822	137	1871	191	2556	220	3943	272
	2.0"	123	90	450	112	1020	145	1396	163	2143	197
	3.0"	87	87	315	102	715	126	980	139	1502	164
36" NPS	BARE	2200		8909		20793		40266		70337	
	1.0"	267	98	979	138	2230	193	3050	221	4704	273
	2.0"	146	90	534	113	1211	146	1658	164	2545	198
	3.0"	102	87	373	103	844	127	1158	140	1775	165
** FLAT	BARE	251		1006		2316		4435		7681	
	1.0"	27	98	101	136	231	189	319	209	491	259
	2.0"	14	90	53	112	122	145	168	158	257	190
	3.0"	10	87	36	103	82	127	114	137	175	160

*Consideration should be given 10 RE/WRAP Insulation thicknesses greater than those listed in this table when high surface temperatures present a hazard to personnel. (Heat loss Btu/hr·ft²)

RE/WRAP INSULATION SYSTEMS

If you're concerned with fast and easy insulation removal and reinstallation when pipes and fittings must be inspected, here's what to do:

Get in touch with PCI's insulation specialists for a preliminary survey of your process piping systems that need insulation which will efficiently permit periodic system maintenance or inspection. They'll evaluate:

- Thermal considerations operating temperatures (steady state and temperature excursions), ambient conditions.
- Environmental considerations weather, abuse, corrosive atmospheres, vibration conditions.
- Scope-lineal feet of piping of required diameters, fittings and equipment, penetrations and interferences.
- Removability and reusability how many inspection or service locations and where; required inspection frequency.

They'll also take a good look at your specifications for removable/reusable insulation, to better understand your requirements. If you wish, they'll assist you in preparing your specifications.

After these evaluations, PCI's insulation specialists can determine whether a standard RE/WRAP insulation system will do the job-or whether a custom installation will best meet your specified needs.

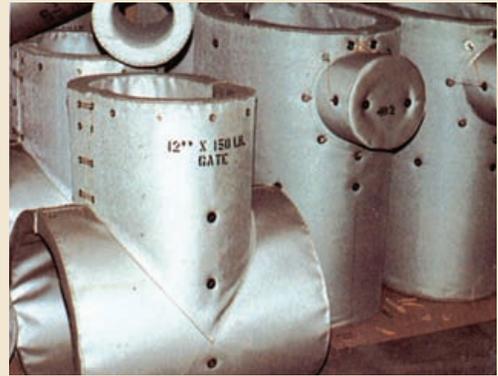
We can then quote your needs-on a materials-only basis, or for material and labor to install the system. We can perform the RE/WRAP installation at your plant with our own experienced crews, or train your personnel to do it quickly and correctly.

With your assistance, we can also perform a life cycle cost/benefit analysis on your RE/WRAP insulation project, taking into consideration these factors:

- The energy cost consequences of un-insulated pipe and equipment in your particular system;
- The installed cost of a thermally efficient, easily removed and reinstalled RE/WRAP insulation system compared to permanent insulation or to other types of removable/reuse able insulation;
- The life cycle cost advantages of the RE/WRAP insulation system in view of energy saved, speed of removal, ease of reinstallation, and frequency of service or inspection.



Semi-rigid RE/WRAP insulation cover, installed over man way on heated storage tank, guards against inadvertent worker contact with elevated temperatures



Semi-rigid valve covers, like all RE/WRAP components, are manufactured in accordance with drawings and specifications that assure high standards of workmanship and correct fit to customers' equipment.



RE/WRAP insulation covers enclose ash-handling equipment and controls beneath 144 precipitator hoppers at this coal-fired power plant, guarding operating personnel against contact with elevated temperatures. Insulation covers are of silicone-impregnated fibrous glass fabric for wear resistance