

**Features:**

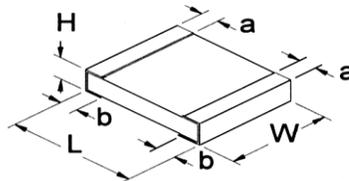
- Precision performance
- High stability
- Tolerances as low as 0.1%
- Temperature coefficient of resistance as low as  $\pm 50$  ppm/ $^{\circ}$ C
- RoHS compliant, REACH compliant, and halogen free
- 0402 and 0603 sizes are AEC-Q200 compliant



Electrical Specifications							
Type/Code	Power Rating (W) @ 70 $^{\circ}$ C	Maximum Working Voltage (V) <sup>(1)</sup>	Maximum Overload Voltage (V)	TCR (ppm/ $^{\circ}$ C)	Ohmic Range ( $\Omega$ ) and Tolerance		
					0.1%	0.5%	1%
RGC0201	0.05	25	50	$\pm 200$	-	10 - 10M	-
RGC0402	0.063	50	100	$\pm 50$	-	100 - 1M	
				$\pm 100$	-	10 - 1M	1 - 1M
				$\pm 200$	-	1.02M - 10M	-
RGC0603	0.1	75	150	$\pm 50$	10 - 1M	10 - 10M	
				$\pm 100$	10 - 1M		1 - 10M
				$\pm 200$	-	1.02M - 10M	-
RGC0805	0.125	150	300	$\pm 50$	10 - 1M	10 - 10M	
				$\pm 100$	10 - 1M		1 - 10M
				$\pm 200$	-	1.02M - 10M	
RGC1206	0.25	200	400	$\pm 50$	10 - 1M	10 - 10M	
				$\pm 100$	10 - 1M		1 - 10M
				$\pm 200$	-	1.02M - 10M	
RGC1210	0.25	200	400	$\pm 100$	-	-	1 - 9.76
				$\pm 50$	10 - 1M	10 - 10M	
	0.33	200	400	$\pm 100$	10 - 1M		10 - 10M
				$\pm 200$	-	1.02M - 10M	-
RGC2010	0.75	200	400	$\pm 50$	10 - 1M	10 - 10M	
				$\pm 100$	10 - 1M		1 - 10M
				$\pm 200$	-	1.02M - 10M	
RGC2512	1	200	400	$\pm 100$	-	-	1 - 9.76
		250	500	$\pm 50$	10 - 1M	10 - 10M	
	$\pm 100$			10 - 1M		10 - 10M	
	$\pm 200$	-	1.02M - 10M				

Note: (1) Lesser of  $\sqrt{P \cdot R}$  or maximum working voltage

**Mechanical Specifications**



Type/Code	Weight (g) (1000 pc.)	L Body Length	W Body Width	H Body Height	a Top Termination	b Bottom Termination	Unit
RGC0201	0.150	0.024 $\pm$ 0.001	0.012 $\pm$ 0.001	0.009 $\pm$ 0.001	0.006 $\pm$ 0.002	0.006 $\pm$ 0.002	inches
		0.60 $\pm$ 0.03	0.30 $\pm$ 0.03	0.23 $\pm$ 0.03	0.15 $\pm$ 0.05	0.15 $\pm$ 0.05	mm

Mechanical Specifications (cont.)							
Type/Code	Weight (g) (1000 pc.)	L Body Length	W Body Width	H Body Height	a Top Termination	b Bottom Termination	Unit
RGC0402	0.620	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.002 0.50 ± 0.05	0.012 ± 0.004 0.30 ± 0.10	0.008 ± 0.004 0.20 ± 0.10	0.010 ± 0.006 0.25 ± 0.15	inches mm
RGC0603	2.042	0.063 ± 0.004 1.60 ± 0.10	0.031 ± 0.004 0.80 ± 0.10	0.018 ± 0.004 0.45 ± 0.10	0.012 ± 0.008 0.30 ± 0.20	0.012 ± 0.008 0.30 ± 0.20	inches mm
RGC0805	4.368	0.079 ± 0.004 2.00 ± 0.10	0.049 ± 0.004 1.25 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	0.016 ± 0.010 0.40 ± 0.25	0.016 ± 0.008 0.40 ± 0.20	inches mm
RGC1206	8.947	0.122 ± 0.006 3.10 ± 0.15	0.061 ± 0.004 1.55 ± 0.10	0.024 ± 0.006 0.60 ± 0.15	0.020 ± 0.010 0.50 ± 0.25	0.020 ± 0.012 0.50 ± 0.30	inches mm
RGC1210	15.959	0.126 ± 0.010 3.20 ± 0.25	0.102 ± 0.006 2.60 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.020 ± 0.010 0.50 ± 0.25	0.020 ± 0.008 0.50 ± 0.20	inches mm
RGC2010	24.241	0.197 ± 0.008 5.00 ± 0.20	0.098 ± 0.006 2.50 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.024 ± 0.010 0.60 ± 0.25	0.024 ± 0.012 0.60 ± 0.30	inches mm
RGC2512	39.448	0.250 ± 0.008 6.35 ± 0.20	0.124 ± 0.008 3.15 ± 0.20	0.022 ± 0.004 0.55 ± 0.10	0.024 ± 0.010 0.60 ± 0.25	0.024 ± 0.012 0.60 ± 0.30	inches mm

Performance Characteristics		
Test	Test Specification	Test Method
	± 1% and below	
Temperature Coefficient of Resistance	As specified.	JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C +125°C, 25°C is the reference temperature
Short Time Overload	±(1% + 0.05Ω)	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or max. overload voltage whichever is lower for 5 seconds; 2 seconds for high power series
Insulation resistance	≥ 10G	JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. overload voltage for 1 minute
Endurance	±(1% + 0.1Ω)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70 ± 2°C, RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"
Damp Heat with Load	±(1% + 0.1Ω)	JIS-C-5201-1 4.24 IEC-60115-1 4.24 40 ± 2°C, 90 ~ 95% R.H., RCWV for 1000 hours with 1.5 hour "ON" and 0.5 hour "OFF"
Dry Heat	±(1% + 0.05Ω)	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +125 / +155°C for 1000 hours
Bending Strength	±(1% + 0.05Ω)	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds 2010, 2512 sizes: 2 mm; other sizes: 3 mm
Solderability	95% minimum coverage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245 ± 5°C for 3 seconds
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260 ± 5°C for 10 seconds
Voltage Proof	No breakdown or flashover	JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times max. operating voltage for 1 minute

Performance Characteristics (cont.)		
Test	Test Specification	Test Method
	± 1% and below	
Leaching	Individual leaching area ≤ 5% Total leaching area ≤ 10%	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260 ± 5°C for 30 seconds
Rapid Change of Temperature	±(0.5% + 0.05Ω)	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +125 / +155°C, 5 cycles

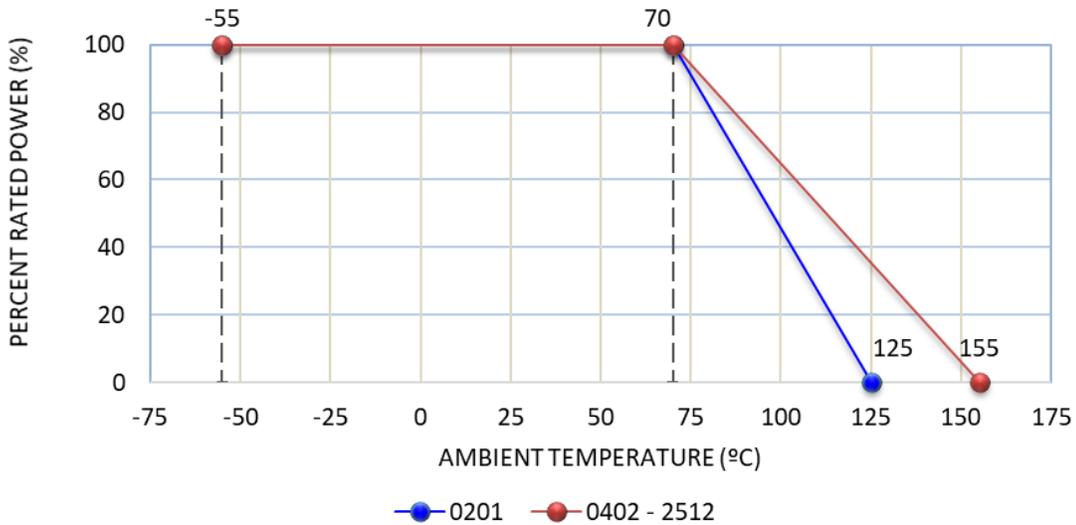
RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or max. operating voltage whichever is lower

Recommended storage temperature: 25 ± 3°C; humidity < 80% RH

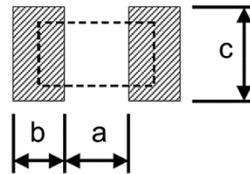
Operating temperature range for 0201 is -55°C to +125°C

Operating temperature range for 0402 - 2512 is -55°C to 155°C

**Power Derating Chart:**



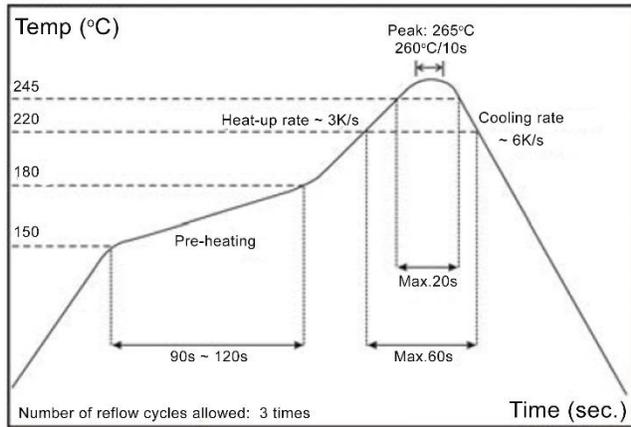
**Recommended Pad Layout**



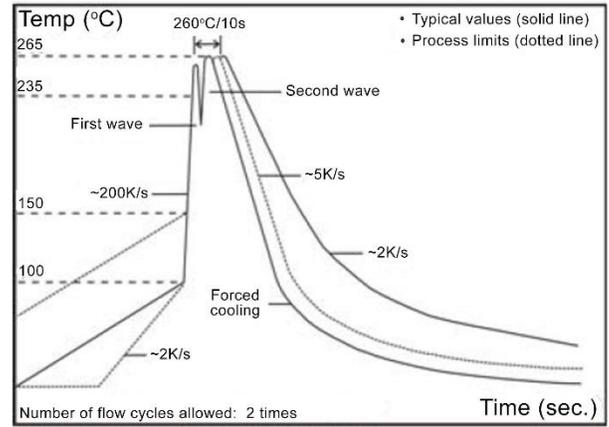
Type/Code	a	b	c	Unit
RGC0201	0.012	0.010	0.012	inches
	0.30	0.25	0.30	mm
RGC0402	0.020	0.018	0.024	inches
	0.50	0.45	0.60	mm
RGC0603	0.035	0.024	0.035	inches
	0.90	0.60	0.90	mm
RGC0805	0.047	0.028	0.051	inches
	1.20	0.70	1.30	mm
RGC1206	0.079	0.035	0.063	inches
	2.00	0.90	1.60	mm

Recommended Pad Layout (cont.)				
Type/Code	a	b	c	Unit
RGC1210	0.079	0.035	0.110	inches
	2.00	0.90	2.80	mm
RGC2010	0.150	0.035	0.110	inches
	3.80	0.90	2.80	mm
RGC2512	0.193	0.063	0.138	inches
	4.90	1.60	3.50	mm

**Soldering Profiles**



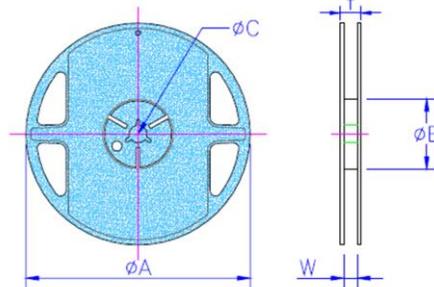
IR Reflow Soldering



Wave Soldering (Flow Soldering)

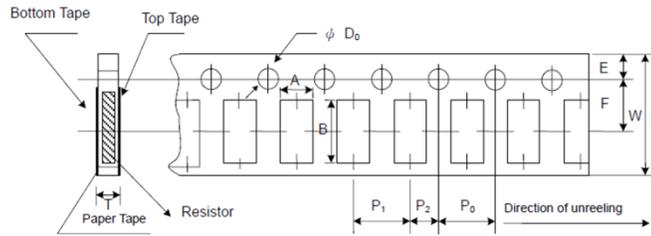
- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10 seconds
- (2) Time of wave soldering at maximum temperature point 260°C : 10 seconds
- (3) Time of soldering iron at maximum temperature point 410°C : 5 seconds

**Reel Specifications**



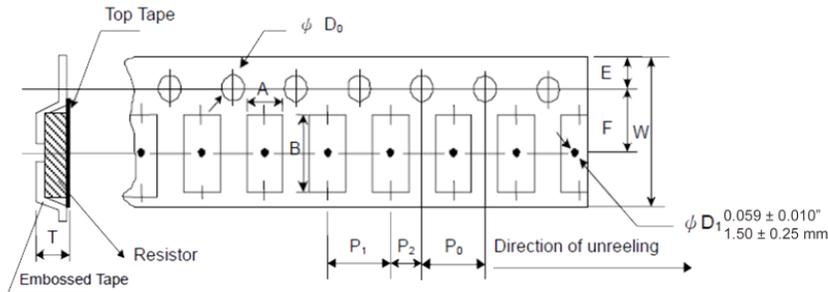
Type/Code	Packaging Description	Tape Width	Reel Diameter	A	B	C	W	T	Unit
RGC0201 RGC0402 RGC0603 RGC0805 RGC1206 RGC1210	Paper	8mm	7 inches	7.028 ± 0.059 178.50 ± 1.50	2.362 ± 0.039 60.00 ± 1.00	0.512 ± 0.008 13.00 ± 0.20	0.354 ± 0.020 9.00 ± 0.50	0.492 ± 0.020 12.50 ± 0.50	inches mm
RGC2010 RGC2512	Plastic	12mm	7 inches	7.028 ± 0.059 178.50 ± 1.50	2.362 ± 0.039 60.00 ± 1.00	0.512 ± 0.020 13.00 ± 0.50	0.512 ± 0.020 13.00 ± 0.50	0.610 ± 0.020 15.50 ± 0.50	inches mm

**Packaging Specifications – Paper Tape**



Type/Code	A	B	W	E	F	Unit
RGC0201	0.015 ± 0.002	0.027 ± 0.002	0.315 ± 0.008	0.069 ± 0.004	0.138 ± 0.002	inches
	0.38 ± 0.05	0.68 ± 0.05	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	mm
RGC0402	0.026 ± 0.004	0.045 ± 0.004	0.315 ± 0.008	0.069 ± 0.004	0.138 ± 0.002	inches
	0.65 ± 0.10	1.15 ± 0.10	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	mm
RGC0603	0.043 ± 0.004	0.075 ± 0.004	0.315 ± 0.008	0.069 ± 0.004	0.138 ± 0.002	inches
	1.10 ± 0.10	1.90 ± 0.10	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	mm
RGC0805	0.063 ± 0.004	0.094 ± 0.008	0.315 ± 0.008	0.069 ± 0.004	0.138 ± 0.002	inches
	1.60 ± 0.10	2.40 ± 0.20	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	mm
RGC1206	0.075 ± 0.004	0.138 ± 0.008	0.315 ± 0.008	0.069 ± 0.004	0.138 ± 0.002	inches
	1.90 ± 0.10	3.50 ± 0.20	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	mm
Type/Code	P0	P1	P2	D0	T	Unit
RGC0201	0.157 ± 0.004	0.079 ± 0.002	0.079 ± 0.002	0.059 ± 0.004	0.017 ± 0.008	inches
	4.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	0.42 ± 0.20	mm
RGC0402	0.157 ± 0.004	0.079 ± 0.002	0.079 ± 0.002	0.059 ± 0.004	0.018 ± 0.004	inches
	4.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	0.45 ± 0.10	mm
RGC0603	0.157 ± 0.004	0.157 ± 0.002	0.079 ± 0.002	0.059 ± 0.004	0.028 ± 0.004	inches
	4.00 ± 0.10	4.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	0.70 ± 0.10	mm
RGC0805	0.157 ± 0.004	0.157 ± 0.002	0.079 ± 0.002	0.059 ± 0.004	0.033 ± 0.004	inches
	4.00 ± 0.10	4.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	0.85 ± 0.10	mm
RGC1206	0.157 ± 0.004	0.157 ± 0.002	0.079 ± 0.002	0.059 ± 0.004	0.033 ± 0.004	inches
	4.00 ± 0.10	4.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	0.85 ± 0.10	mm

**Packaging Specifications – Plastic Tape**



Type/Code	A	B	W	E	F	Unit
RGC2010	0.110 ± 0.004	0.217 ± 0.004	0.472 ± 0.012	0.069 ± 0.004	0.217 ± 0.002	inches
	2.80 ± 0.10	5.50 ± 0.10	12.00 ± 0.30	1.75 ± 0.10	5.50 ± 0.05	mm
RGC2512	0.138 ± 0.004	0.264 ± 0.004	0.472 ± 0.012	0.069 ± 0.004	0.217 ± 0.002	inches
	3.50 ± 0.10	6.70 ± 0.10	12.00 ± 0.30	1.75 ± 0.10	5.50 ± 0.05	mm
Type/Code	P0	P1	P2	D0	T	Unit
RGC2010	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.059 ± 0.004	0.047 ± 0.000	inches
	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	1.20 ± 0.00	mm
RGC2512	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.059 ± 0.004	0.047 ± 0.000	inches
	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	1.20 ± 0.00	mm

**Part Marking Instructions**

**E96 and E24 Values For Sizes 0805 to 2512 (0.1%, 0.5% and 1% tolerances)**

The nominal resistance is marked on the surface of the overcoating with the use of **four character markings**.

1. Values <100Ω will use "R" as the decimal holder



1.21Ω



100Ω

**E24 Values For Size 0603 (0.1% and 0.5% tolerances)**

The nominal resistance is marked on the surface of the overcoating with the use of **three character markings**.

1. First and second digits are E24 code; third digit is the multiplier



100Ω

**E96 Values For Size 0603 (1% tolerance)**

A two character number is assigned to each standard R-Value (E96) as shown in the chart below. This is followed by one alpha character which is used as a multiplier.

Each letter from "Y" - "F" represents a specific multiplier.

Alpha Character = Multiplier	
Y = 0.1	C = 1000
X = 1	D = 10000
A = 10	E = 100000
B = 100	F = 1000000

Chip Marking	Value
01B =	10.0 x 100 = 1 KΩ
25C =	17.8 x 1000 = 17.8 KΩ
93D =	90.9 x 10000 = 909 KΩ



10.5Ω

**E96**

#	R-Value										
01	10.0	17	14.7	33	21.5	49	31.6	65	46.4	81	68.1
02	10.2	18	15.0	34	22.1	50	32.4	66	47.5	82	69.8
03	10.5	19	15.4	35	22.6	51	33.2	67	48.7	83	71.5
04	10.7	20	15.8	36	23.2	52	34.0	68	49.9	84	73.2
05	11.0	21	16.2	37	23.7	53	34.8	69	51.1	85	75.0
06	11.3	22	16.5	38	24.3	54	35.7	70	52.3	86	76.8
07	11.5	23	16.9	39	24.9	55	36.5	71	53.6	87	78.7
08	11.8	24	17.4	40	25.5	56	37.4	72	54.9	88	80.6
09	12.1	25	17.8	41	26.1	57	38.3	73	56.2	89	82.5
10	12.4	26	18.2	42	26.7	58	39.2	74	57.6	90	84.5
11	12.7	27	18.7	43	27.4	59	40.2	75	59.0	91	86.6
12	13.0	28	19.1	44	28.0	60	41.2	76	60.4	92	88.7
13	13.3	29	19.6	45	28.7	61	42.2	77	61.9	93	90.9
14	13.7	30	20.0	46	29.4	62	43.2	78	63.4	94	93.1
15	14.0	31	20.5	47	30.1	63	44.2	79	64.9	95	95.3
16	14.3	32	21.0	48	30.9	64	45.3	80	66.5	96	97.6

Note: Sizes 0201 and 0402 are unmarked.

**RoHS Compliance**

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union’s directive regarding “Restrictions on Hazardous Substances” (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
RGC	Semi-Precision Thick Film Surface Mount Resistor	SMD	YES(1)	100% Matte Sn over Ni	Jul-04	04/27

Note (1): RoHS Compliant by means of exemption 7c-l.

**“Conflict Metals” Commitment**

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

**Compliance to “REACH”**

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

**Environmental Policy**

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

**How to Order**

