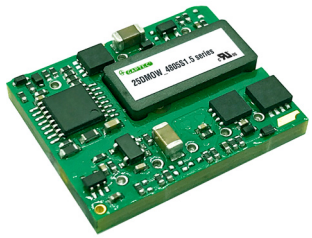

25DMOW_1.5 series

25W - Single Output - Wide Input - Isolated & Regulated
DC-DC Converter

DC-DC Converter 25 Watt

- Wide 2:1 input voltage range
- High efficiency up to 88%
- Short circuit protection (SCP)
- Isolation voltage: 1.5kVDC
- Over-current, over-voltage, over-temperature protection
- Input under-voltage lockout
- RoHS compliant
- Operating temperature range: -40°C to +85°C
- Fixed switching frequency
- Remote on/off negative logic
- International standard pin-out
- Monotonic startup into pre-biased loads
- Adjustable output voltage range
- IEC/UL/EN60950-1 approved

UL-60950-1 (E347551)

The 25DMOW_1.5 series are isolated 25W DC/DC converters with 2:1 input voltage. They feature efficiency up to 88%, 1500VDC isolation, operating temperature of -40°C to +85°C, input under-voltage protection, output over-voltage, output over-current, output short circuit protection and meets IEC60950-1.

They are widely applied in optical networking equipment, wireless base stations, microwave radio communications, telecom and data equipment applications.

Common specifications

Short circuit protection:	Hiccup, continuous, self-recovery
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C~+125°C
Storage humidity range:	90% MAX
Thermal stability time:	30mins
FIT:	312.5; 10^9/MTBF
Vibration:	IEC60068-2-6: 10~500Hz sweep, 0.75mm excursion, 10g acceleration, 10minutes in each 3 perpendicular directions
Shock:	IEC 60068-2-27:200g acceleration, duration 3ms, 6 drops in each 3 perpendicular directions
Safety:	Compliant to IEC60950-1, UL60950-1, EN60950-1 and GB4943
Switching frequency:	450KHz TYP, fixed frequency
Transportation:	ETS300019-1-2
MTBF (Telcordia SR332, ground fixed, 40°C):	3,200,000 hours
Weight:	6.5g

Protection specifications

Item	Test condition	Min	Typ	Max	Units
Input under voltage lockout	• Turn-on • Turn-off • Hysteresis	33 31	34 33 1	36 35	V V V
Short circuit current	Hiccup		0.3		A
Over current protection	Hiccup mode, automatic recovery		yes		
Over voltage protection	Under the converter's maximum allowable output power. Hiccup mode, minimum load of 20%Io max	6		7.2	V
Over temperature protection	Automatic recovery See OTP section		115		°C
Over Temperature Protection Hysteresis	Automatic recovery See OTP section		5		°C

Example:
25DMOW_4805S1.5
25 = 25Watt; D = DIP; M = Miniature; O = Open frame; W = wide input (2:1); 36-75Vin; 5Vout; S = single output; 1.5 = 1500VDC

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage set point 25°C, Io=Io (max)		4.95	5	5.05	V
Line regulation*	Vin(min to Vin(max) Io= Io(max), Vo=Vo(nom)		±0.1		%Vo
Load regulation*	Vin=Vin(nom) Io=0 to Io (max)		±0.125		%Vo
Voltage precision	At 50% load			±1	%Vo
Voltage adjustment range		-20		10	%Vo
Remote sense	Vsense = Vout - Vload, sense connected at load			10	%Vo
Current Limit		5.5		7.5	A
External load capacitance	Full resistive load, low ESR	0		2200	µF
Temperature coefficient	At all outputs			200	ppm/°C
Dynamic response recovery time	25%-50%-25%,50%-75%-50% Io(nom)		100	200	µS
Dynamic response	50%-75%-50%,di/dt=2.5A/µS • Recovery time • Overshoot		 75 ±150		 µs mV
Ripple and noise**			50		mVp-p
Turn-on delay time	Time from instant at which Vin=Vin (Turn-on) until Vo=10% of Vo (nom)		10	50	ms
Turn-on rise time	Time for Vo to rise from 10% of Vo (nom) to 90% of Vo (nom)		10	50	ms

* Regulation specifications describe the deviation as the input line voltage or output load current is varied from a nominal midpoint value to either extreme (50% load).
** Output noise may be further reduced by installing an external filter. See Ripple&Noise test setup. Use only as much output filtering as needed and no more. Larger caps (especially low-ESR ceramic types) may slow transient response or degrade dynamic performance. Thoroughly test your application with all components installed.

Remote control specifications

Item	Test condition	Min	Typ	Max	Units
Logic low voltage		-0.7		1.2	V
Logic high voltage		2.4		14	V
Control current			1		mA

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25DMOW_1.5 series

25W - Single Output - Wide Input - Isolated & Regulated DC-DC Converter

Input specifications

Item	Test condition	Min	Typ	Max	Units
Operating input voltage		36	48	75	V
Max. input current	100% load Vin= Vin (min) to Vin (max)			0.9	A
Input current	no load, full input		45	75	mA
Short circuit input current			50		mA
Reflected ripple current	peak-to-peak		15		mA
Inrush transient	Vin=48V		0.05		A^2S
Input fuse	Fast blow			2	A

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage*	Input/output		1500		VDC
Isolation resistance**	Test at 500VDC	10			MΩ
Isolation capacitance			2200		pF

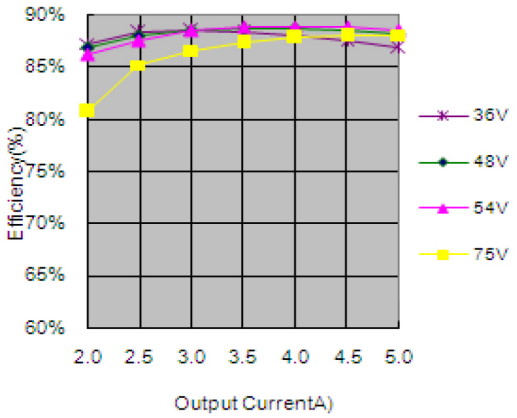
* Test duration 1 minute, leak current lower than 10mA
** The isolation resistance of input to output is no less than 10MΩ

Product Selection Guide

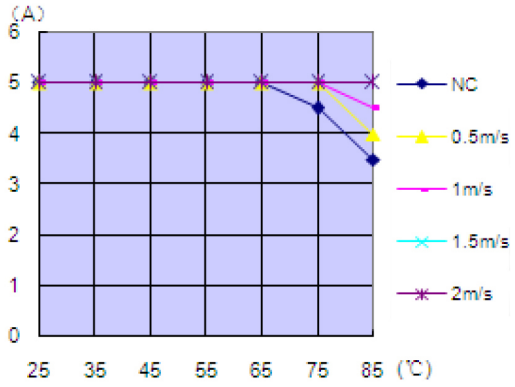
Part Number	Input Voltage [VDC] Nominal	Range	Max	Output Voltage [VDC]	Output Current [A, max]	Efficiency [%, Min./Typ.]	Capacitive load [µF, Max.]
25DMOW_4805S1.5	5	36-75	80	5	5000	86/88	1000

Typical characteristics

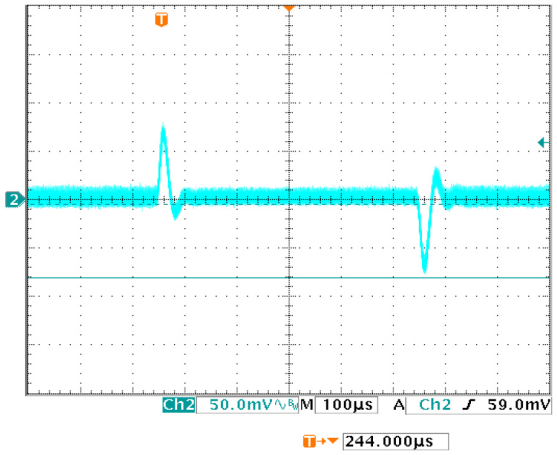
Efficiency
Converter Efficiency Vs. Output Current



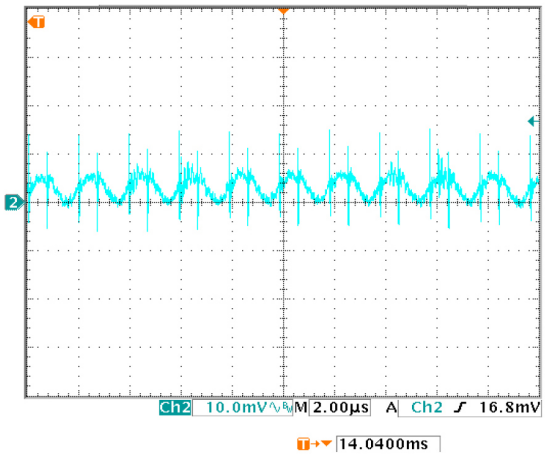
Derating
Available load current vs. ambient temperature and airflow for the module mounted horizontally



Dynamic Response
Vin=48V/Vo=5V,50%-75%-50%load,2.5A/µs @25°C



Output ripple & noise
@25°C(Vin=48V/Io=5A,20MHz bandwidth)



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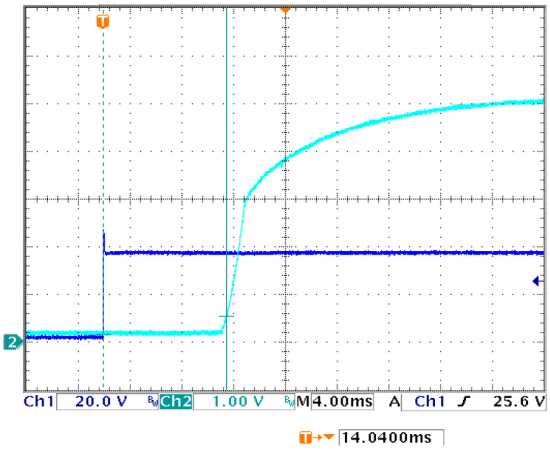
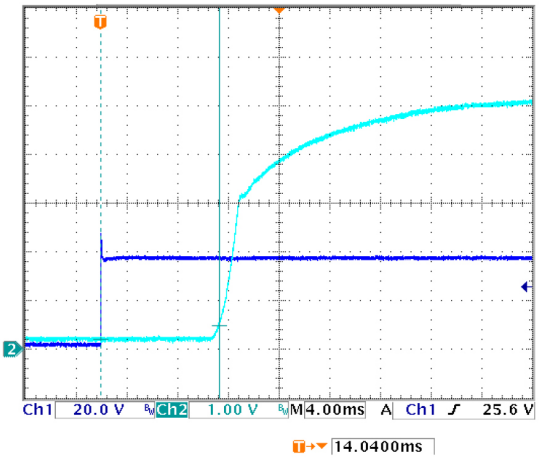
Typical characteristics

Start-up
Typical Start-up @25°C(Vin=48V/Io=5A)

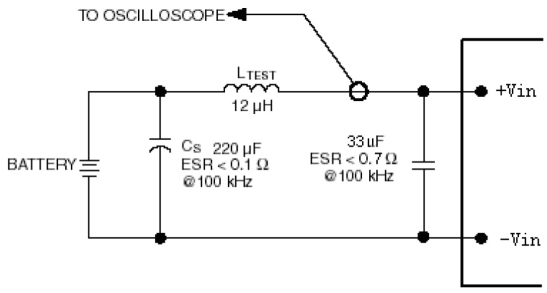


Start-up
Typical Start-up @25°C(Vin=48V/Io=0A)



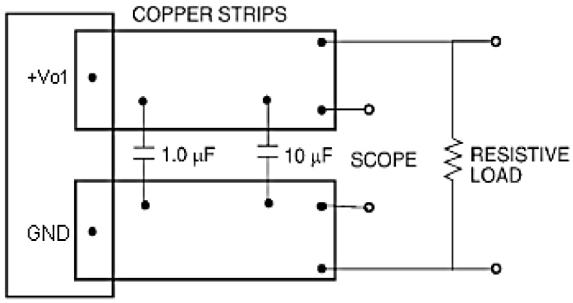
Test configurations

Input Reflected Ripple Current Test Setup



Measure input reflected ripple current with a simulated source inductance of 12µH. The measurement points for input reflected ripple current is showed above.

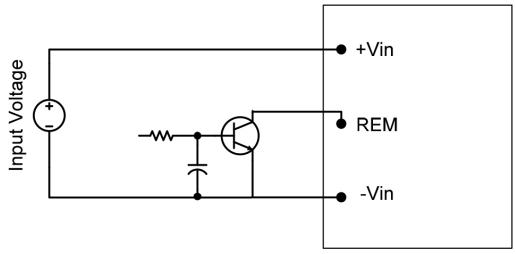
Output Ripple and Noise Test Setup



Scope measurements should be made using a BNC socket, with 220µF Tantalum capacitor and 2*47µF ceramic capacitor. Position the oscilloscope between 51mm and 76mm (2 inch and 3 inch) from the module.

Remote on/off

Remote On/Off Implementation



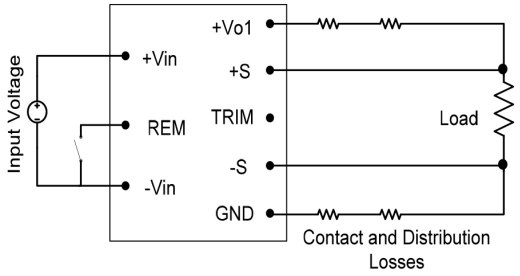
The REM pin is used to turn the power converter remote on or off via a system signal. This power module is negative logic version. When the REM pin is at logic low the power turns on and turns off at logic high. We also provide positive logic remote On/Off, turns the module on during logic high voltage and off during a logic low.

To turn the power module on and off, the user must supply a switch to control the voltage between the REM pin and -Vin terminal (see Figure on the left). A logic low is VREM =-0.7V to 1.2V. During logic high, the maximum VREM voltage generated by the power module is 15V.

If not using the remote on/off feature, perform one of the following to turn the converter on:
For negative logic, short REM pin to -Vin.
For positive logic, leave REM pin open.

Remote sense

Circuit configuration for remote sense

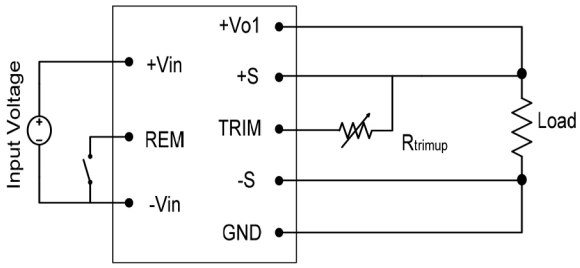


Remote sense minimizes the effects of distribution losses by regulating the voltage at the remote sense connections (see figure on the left). The voltage between the remote sense pins and
the output terminals must not exceed the output voltage sense range (<10% Vo(nom)).

The voltage between the +VO1 and GND terminals must not exceed the minimum output overvoltage protection value shown in the Electrical Specifications table. This limit includes any increase in voltage due to remote sense compensation and output voltage programming (trim). If not using the remote sense feature to regulate the output at the point of load, then connect +S to +VO1 and -S to GND.

Output voltage programming

Circuit configuration to increase output voltage



Output voltage trim allows the user to increase or decrease the output voltage set point of a module. This is accomplished by connecting an external resistor between the TRIM pin and either the +S or -S pins. If not using the trim feature, leave the TRIM pin open.

To increase the output voltage, refer to the figure on the left. A trim resistor, Rtrimup, is connected between the TRIM and +S.

$$R_{Trimup} = \left(\frac{5.11 \times Vout(100+\Delta)}{1.225 \times \Delta} - \frac{511}{\Delta} - 10.22\right)k\Omega$$

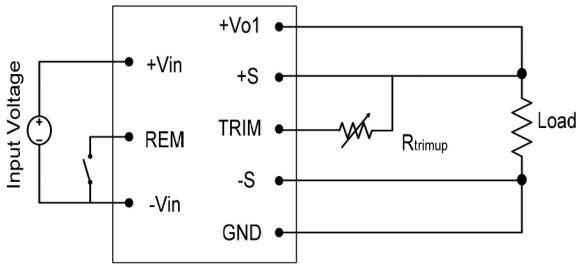
$$\Delta = \left| \frac{V_{trimup} - V_{OUT}}{V_{OUT}} \times 100 \right|$$

V_{OUT} = Nominal value of output voltage [V]

V_{trimup} = Desired (trimmed) output voltage [V].

Output voltage programming

Circuit configuration to decrease output voltage



Trimming beyond 110% of the rated output voltage is not an acceptable design practice, as this condition could cause unwanted triggering of the output overvoltage protection (OVP) circuit. When trimming up, care must be taken not to exceed the converter's maximum allowable output power.

To decrease the output voltage (see figure on the left), a trim resistor, Rtrimdown, should be connected between the TRIM and -S, with a value of

$$R_{Trimdown} = (\frac{511}{\Delta} - 10.22)k\Omega$$

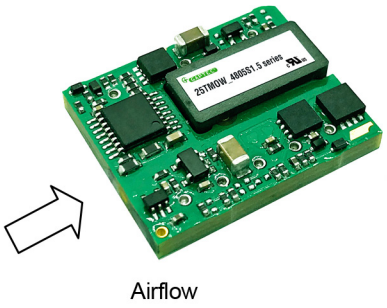
$$\Delta = \left| \frac{V_{trimdown} - V_{OUT}}{V_{OUT}} \times 100 \right|$$

V_{OUT} = Nominal value of output voltage [V]

$V_{trimdown}$ = Desired (trimmed) output voltage [V].

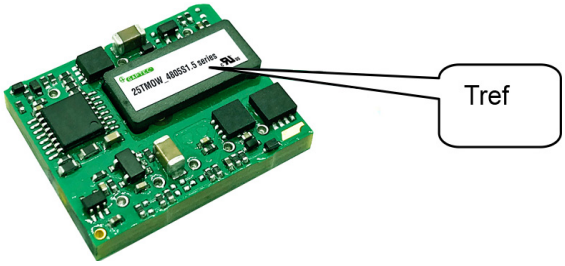
Heat transfer via convection

Recommended airflow direction

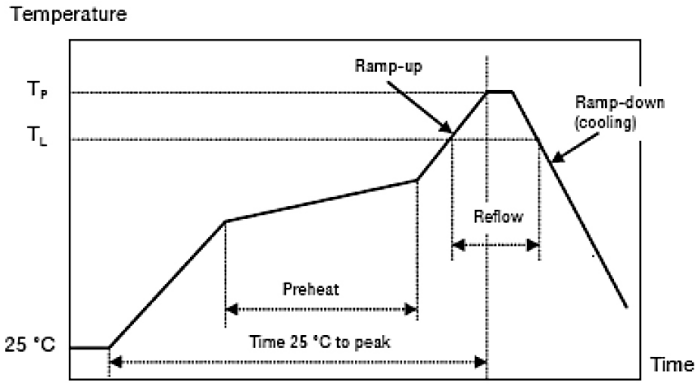


Over temperature protection

Tref Temperature Measurement Location



Recommended reflow profile

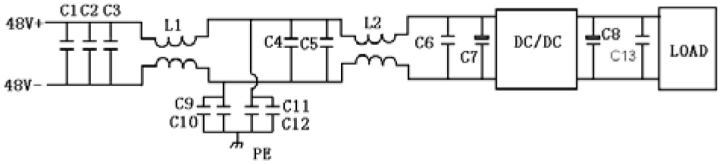


Reflow process specifications		Pb-free
Average ramp-up rate		3°C/s max
Solder melting temperature (lim)	T_L	+217°C
Time above T_L		30 s~90s
Minimum pin temperature	T_{pin}	+235°C
Peak product temperature	T_p	+245°C
Average ramp-down rate		6°C/s max
Time 25°C to peak		6 minutes max

Lead-free (Pb-free) solder processes
For Pb-free solder processes, a pin temperature (TPIN) in excess of the solder melting temperature (TL, +217°C to +221°C for Sn/Ag/Cu solder alloys) for more than 30 seconds, and a peak temperature of +235°C on all solder joints is recommended to ensure a reliable solder joint.

For Pb-free solder processes, the product is qualified for MSL 3 according to IPC/JEDEC standard J-STD-020C. During reflow, TP must not exceed +245°C at any time.

Recommended EMC application

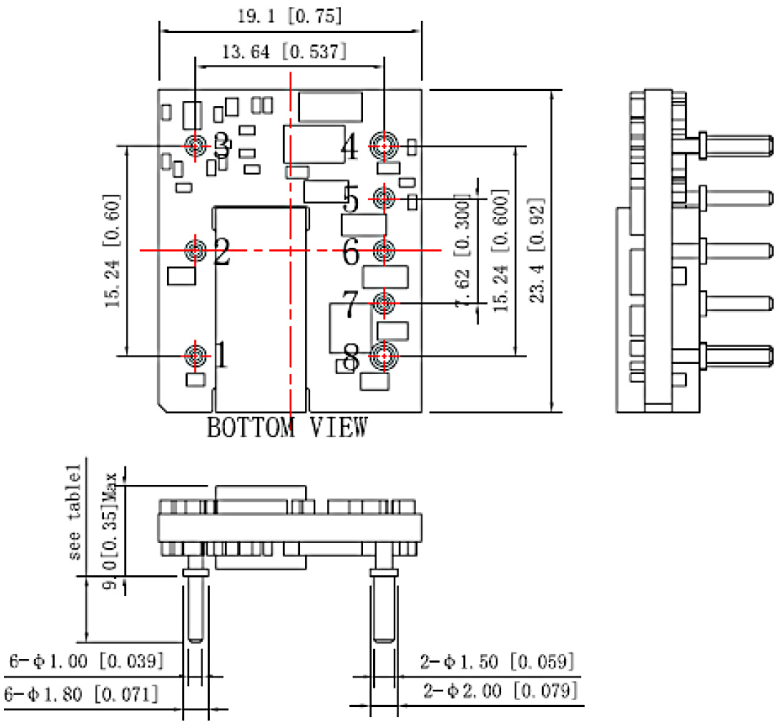


Suggested configuration to meet the conducted emission limits of EN55022 Class B.

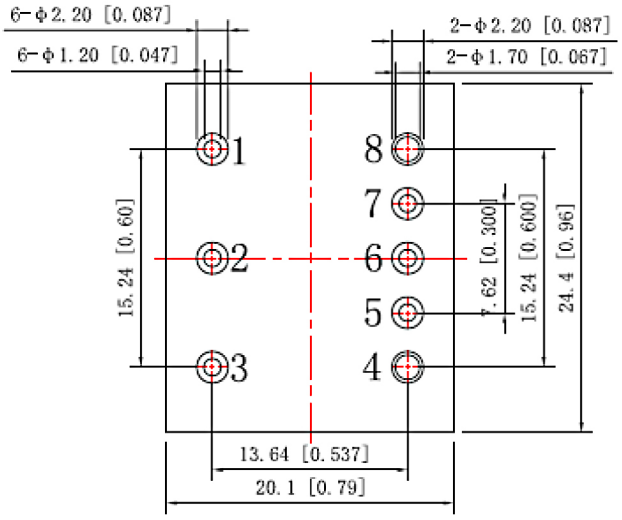
Component	Specifications
C1 C2 C3 C4 C5	SMD ceramic capacitor-1uF
C6	SMD ceramic capacitor-0.1uF
L1 L2	Magnetic material-473uH-+-25%
C9 C10 C11 C12	High dielectric strength surface attached safety capacitor-0.22uF
C7	Electrolytic capacitor-100uF
C8	Tantalum capacitor -220uF
C13	ceramic capacitor-2*47μF

Mechanical dimensions

Through hole mounting



Recommended pad layout



Pin options	Pin length
A	2.80(0.110)
B	3.60(0.142)
C	4.57(0.180)
D	5.80(0.228)
E	6.35(0.250)

Note:
Dimensions are in millimeters and (inches).

Tolerances:
x.x mm ± 0.5 mm (x.xx in. ± 0.02 in.) [unless otherwise indicated]
x.xx mm ± 0.25 mm (x.xxx in. ± 0.010 in)

Note:
1. The maximum capacitive loads offered were tested at input voltage range and full load.
2. Only typical model listed. Non-standard models will be different from the above, please contact us for more details.
3. All specifications are measured at TA = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. We can provide product customization service, please contact our technicians directly for specific information.
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.