

RCP Emission Factor Reference Table: All Values in One Place

THE AGENCY *PLAYBOOK*

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This reference table consolidates all emission factors used in Restoration Carbon Protocol calculations. It is the lookup document you use when completing a per-job carbon report — every factor needed for Categories 1, 4, 5, and 12 across all five job types is in this table, with source citations for audit purposes.

Version: RCP v1.0 | **Factor vintage:** EPA 2024, DEFRA 2024, EPA WARM v16 | **Units:** All values in kg CO2e unless noted as tCO2e

Table 1: Category 4 — Vehicle Transportation

VEHICLE TYPE	FUEL	KG CO2E PER MILE	SOURCE
Passenger car	Gasoline	0.355	EPA Table 2, Mobile Combustion 2024
	Gasoline	0.503	

Light-duty truck / work van (under 8,500 lbs GVWR)			EPA Table 2, Mobile Combustion 2024
Light-duty truck / cargo van	Diesel	0.523	EPA Table 2, Mobile Combustion 2024
Medium-duty truck / equipment trailer (8,500–26,000 lbs GVWR)	Diesel	1.084	EPA Table 2, Mobile Combustion 2024
Heavy-duty truck — unloaded (26,000+ lbs GVWR)	Diesel	1.612	EPA Table 2, Mobile Combustion 2024
Heavy-duty truck — loaded (waste hauling, C&D)	Diesel	2.25	EPA Table 2 + load factor adjustment
Licensed hazmat waste hauler (ACM, lead, general hazmat)	Diesel	3.20	EPA Table 2 + hazmat vehicle premium
Licensed hazmat hauler (PCB, high-hazard specialty)	Diesel	3.80	EPA Table 2 + specialty vehicle premium
Medical waste hauler (biohazard)	Diesel	2.80	EPA Table 2 + medical waste vehicle
Pack-out truck (contents restoration) — loaded	Diesel	2.25	EPA Table 2 + load factor
Pack-out truck — empty (return trip)	Diesel	1.612	EPA Table 2 — unloaded heavy

Table 2: Category 1 — Materials

Chemical Treatments

MATERIAL	UNIT	KG CO2E PER UNIT	SOURCE

Quaternary ammonium antimicrobial / biocide (liquid)	Liter	2.8	EPA EEIO — Chemical manufacturing sector
Hydrogen peroxide-based antimicrobial/biocide	Liter	1.9	EPA EEIO — Chemical manufacturing sector
Borax-based mold treatment	kg	1.1	EPA EEIO — Inorganic chemical manufacturing
Hospital-grade disinfectant (EPA-registered)	Liter	2.8	EPA EEIO — Chemical manufacturing sector
Enzyme biological digester / deodorizer	Liter	1.6	EPA EEIO — Specialty chemical manufacturing
Encapsulant / smoke-blocking primer	Gallon	4.2	EPA EEIO — Paint and coatings manufacturing
Thermal fogging agent	Liter	2.1	EPA EEIO — Chemical manufacturing sector
Desiccant drying agent (silica gel)	kg	1.4	EPA EEIO — Chemical manufacturing sector
Wetting agent / amended water (surfactant for ACM)	Liter	1.4	EPA EEIO — Chemical manufacturing sector
Dry ice (CO2 pellets for blast cleaning)	kg	0.85	EPA EEIO — Industrial gas manufacturing

Personal Protective Equipment

PPE ITEM	UNIT	KG CO2E PER UNIT	SOURCE
Disposable Tyvek suit (Level C)	Each	1.2	EPA EEIO — Apparel manufacturing

Level B full encapsulating suit	Each	3.0	EPA EEIO — Apparel/ specialty manufacturing
Level C PPE full kit (Tyvek + gloves + goggles + boot covers)	Kit	1.8	Composite of individual items
Level B PPE full kit (encapsulating suit + supplied air + gloves)	Kit	4.2	Composite of individual items
Nitrile gloves (pair)	Pair	0.3	EPA EEIO — Rubber and plastics manufacturing
N95 respirator (disposable)	Each	0.4	EPA EEIO — Medical equipment manufacturing
Half-face respirator, P100 cartridges (pair)	Pair	0.8	EPA EEIO — Medical equipment manufacturing
Full-face respirator cartridges (pair)	Pair	1.2	EPA EEIO — Medical equipment manufacturing
Boot covers (pair)	Pair	0.15	EPA EEIO — Rubber and plastics

Containment and Filtration

MATERIAL	UNIT	KG CO ₂ E PER UNIT	SOURCE
6-mil polyethylene sheeting	m ²	0.55	EPA EEIO — Plastics product manufacturing
4-mil polyethylene sheeting	m ²	0.37	EPA EEIO — Plastics product manufacturing
Double-layer 6-mil containment (hazmat/biohazard)	m ²	1.10	2× single-layer factor

Zipper door — disposable	Each	1.8	EPA EEIO — Plastics/hardware
Zipper door — reusable (amortized over 20 uses)	Use	0.09	1.8 ÷ 20 uses
HEPA filter — air scrubber (standard)	Each	3.2	EPA EEIO — Industrial machinery manufacturing
HEPA vacuum bag (commercial grade)	Each	0.4	EPA EEIO — Paper/plastics manufacturing
Biohazard bag — 33-gallon red (medical waste)	Each	0.65	EPA EEIO — Medical plastics manufacturing
ACM disposal bag — 6-mil labeled (33-gallon)	Each	0.55	EPA EEIO — Plastics product manufacturing
Sharps disposal container (1- gallon)	Each	0.35	EPA EEIO — Plastics/medical equipment
Glove bag (pipe insulation removal)	Each	0.85	EPA EEIO — Plastics product manufacturing

Table 3: Category 5 — Waste Disposal

WASTE TYPE	DISPOSAL METHOD	TCO2E PER TON	SOURCE
Standard C&D debris (non-hazardous mixed)	Landfill	0.16	EPA WARM v16
Cat 2 water- contaminated porous materials	Standard landfill	0.18	EPA WARM + contamination premium
		0.22	

Cat 3 sewage-contaminated materials	Regulated C&D landfill		EPA WARM + regulated disposal
Smoke-contaminated C&D debris (standard)	Standard landfill	0.16	EPA WARM v16
Smoke-contaminated C&D (regulated facility)	Licensed C&D landfill	0.20	EPA WARM + transport premium
Mold-contaminated porous materials	Standard landfill (most jurisdictions)	0.18	EPA WARM + contamination premium
Friable ACM (pipe insulation, spray fireproofing)	Licensed hazmat landfill	0.42	EPA WARM + licensed facility + transport
Non-friable ACM (floor tiles, roofing, joint compound)	Licensed C&D with ACM cell	0.28	EPA WARM + regulated C&D transport
Lead paint debris (TCLP-classified hazardous)	Licensed hazmat landfill	0.38	EPA WARM + hazmat transport
PCB-containing materials ≥ 50 ppm	Licensed PCB incineration	1.85	EPA hazardous waste incineration factors
PCB-containing materials < 50 ppm	Licensed landfill	0.22	EPA WARM + transport premium
Mercury-containing lamps/thermostats	Mercury recycler	0.15	EPA WARM — recycling credit offset
Regulated medical/biohazard waste (standard)	Autoclave + licensed landfill	0.55	EPA medical waste treatment factors
High-pathogen biohazard waste	High-temperature incineration	0.85	EPA hazardous waste incineration factors

Sharps waste	Sharps autoclave or incineration	0.65	EPA medical waste — sharps category
Contaminated water (Cat 3, to wastewater treatment)	Municipal wastewater treatment	0.000272 per liter	EPA WARM v16 — wastewater treatment
Disposable PPE — standard	Standard landfill	0.25	EPA WARM — mixed plastics
Disposable PPE — hazmat-contaminated	Licensed hazmat or medical waste landfill	0.30–0.55	Apply appropriate hazmat or medical waste factor

Table 4: Category 12 — Demolished Building Materials

MATERIAL	TCO2E PER TON (LANDFILL)	TCO2E PER TON (RECYCLED)	SOURCE
Gypsum drywall (1/2")	0.16	0.02	EPA WARM v16
Dimensional lumber / wood framing	-0.07	-0.15	EPA WARM v16 — carbon storage credit
OSB sheathing	-0.05	-0.12	EPA WARM v16 — carbon storage credit
Carpet + pad (standard residential/ commercial)	0.33	0.05	EPA WARM v16
Hardwood flooring	-0.12	-0.18	EPA WARM v16 — carbon storage credit
Vinyl / LVP flooring	0.28	0.08	EPA WARM v16 — plastics category

Ceramic / porcelain tile	0.04	0.01	EPA WARM v16 — inert material
Fiberglass batt insulation	0.33	0.05	EPA WARM v16
Cellulose insulation (spray or loose-fill)	0.06	-0.02	EPA WARM v16
Spray polyurethane foam insulation (SPF)	0.72	N/A	EPA WARM v16 — plastics category
Acoustic ceiling tiles (standard)	0.12	0.03	EPA WARM v16 — ceiling tile category
Structural steel (demolished)	-0.85	-0.95	EPA WARM v16 — steel recycling credit
Copper pipe / wiring	-0.45	-0.60	EPA WARM v16 — copper recycling credit
Aluminum (ductwork, framing)	-1.20	-1.45	EPA WARM v16 — aluminum recycling credit (high value)

Weight Estimation Proxies

When disposal receipts are not available, use these weight proxies to estimate demolished material tonnage:

MATERIAL	WEIGHT PER SQ FT (INSTALLED, DRY)	NOTES
1/2" gypsum drywall	2.5 lbs	Use dry weight, not post-water-damage wet weight

5/8" gypsum drywall (Type X)	3.1 lbs	Common in commercial construction
Carpet + pad (residential)	3.0 lbs	Including pad and tack strips
Carpet + pad (commercial, glue-down)	2.2 lbs	Heavier carpet, no pad
LVP / vinyl plank flooring	2.8 lbs	Including underlayment
Ceramic tile (floor, 3/8")	4.5 lbs	Including thin-set mortar
Acoustic ceiling tiles (2'x2' standard)	1.8 lbs	Mineral fiber type
Fiberglass batt insulation (3.5" R-13)	0.5 lbs	Per sq ft of coverage area
Dimensional lumber 2x4 wall framing (per linear foot of wall)	4.0 lbs	Assumes 16" OC framing in 8-ft walls
Non-friable ACM floor tile (9"x9")	4.0 lbs	Including mastic adhesive

How often will this reference table be updated?

The RCP emission factor reference table will be updated annually following the release of updated EPA WARM, EPA Mobile Combustion, and DEFRA databases. Version numbers are included in the table header — always cite the version used in your per-job carbon report data quality notes.

What if I need an emission factor for a material not in this table?

First check EPA WARM v16 directly (available free at epa.gov/warm). Second, check the EPA EEIO database for the relevant industry sector. Third, check DEFRA's Conversion Factors for Company Reporting. If none of these sources

contain the specific material, use the closest proxy category and document the substitution in your data quality notes.

Are these factors suitable for use in EU CSRD reporting?

EPA and EPA WARM factors are US-specific but are accepted in most international ESG frameworks when accompanied by clear source citation. For EU CSRD reporting specifically, DEFRA factors (UK) or OECD emission factors may be preferred by auditors for non-US operations. The RCP will publish a DEFRA-specific factor table in a future supplement for EU-applicable reporting contexts.

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Table 6: Refrigerant GWP Values — IPCC AR6 Update

The Global Warming Potential values for refrigerants used in restoration drying equipment have been updated under IPCC Sixth Assessment Report (AR6, 2021). AR6 GWP-100 values are **14–18% higher than AR5** for the HFCs commonly found in LGR dehumidifiers. RCP v1.0 uses AR6 values for refrigerant-related calculations. The EPA AIM Act continues to use AR4 values for regulatory compliance; UNFCCC/Paris reporting uses AR5. When delivering data to clients, disclose which GWP vintage was used.

REFRIGERANT	COMMON USE IN RESTORATION	AR5 GWP-100	AR6 GWP-100	CHANGE
R-410A (HFC-32/125 blend)	Most current LGR dehumidifiers	~1,924	~2,256	+17.3%
R-32 (HFC-32)	Dri-Eaz LGR 6000i; newer units	677	771	+13.9%

R-454B (HFC-32/ HFO-1234yf blend)	Next-gen low-GWP units	~467	~530	+13.5%
HFC-134a (R-134a)	Older residential dehumidifiers	1,300	1,530	+17.7%

Source: IPCC AR6 WG1, Chapter 7, Table 7.SM.7 (2021). EPA Technology Transitions GWP Reference Table.

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Table 7: EPA eGRID 2023 — Subregional Emission Factors for Major Restoration Markets

The national average grid factor (0.3497 kg CO₂e/kWh, eGRID 2023) used as the RCP default understates or overstates electricity emissions significantly depending on where equipment is operated. Using location-specific subregion factors improves data quality for clients in GRESB, SBTi, and CSRD reporting contexts.

Use the subregion factor for the state/metro where the job was performed, not where the contractor’s facility is located.

EGRID SUBREGION	PRIMARY COVERAGE	KG CO ₂ E/ KWH	VS. RCP DEFAULT (0.3499)
NYUP	Upstate New York	0.1101	-68.5%
CAMX	California / Western US	0.1950	-44.3%
NEWE	New England	0.2464	-29.6%
ERCT	Texas (ERCOT)	0.3341	-4.5%

US Average	National default (RCP v1.0)	0.3497	Baseline
FRCC	Florida	0.3560	+1.7%
SRSO	Southeast (excluding FL)	0.3837	+9.7%
NYCW	NYC and Westchester	0.3927	+12.2%

Source: EPA eGRID2023 Summary Tables Rev 2 (published March 2025). Full subregion table available at epa.gov/eGRID. A California restoration contractor using the national average **overstates electricity emissions by 44%**; a Florida contractor understates by 1.7%. The difference is largest for multi-week jobs with sustained equipment energy consumption.

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Table 8: PPE and Consumables — LCA-Sourced Per-Unit Emission Factors

The EPA EEIO proxies in Table 2 are sector-level estimates. The following values are sourced from published lifecycle assessments and Environmental Product Declarations for specific product types. Use these in place of the EEIO values where the product type matches.

ITEM	UNIT	KG CO ₂ E	SOURCE	VS. EEIO PROXY
Nitrile glove (3.5g, size M)	Each	0.0277	Top Glove LCA 2024, SATRA-verified	-82% vs. EEIO pair proxy
Nitrile glove pair	Pair	0.0554	Top Glove LCA 2024	-82% vs. current 0.3 EEIO
	Each	0.05		

N95 respirator (disposable)			Springer Env. Chem. Letters 2022	-88% vs. current 0.4 EEIO
DuPont Tyvek 400 coverall (180g HDPE)	Each	0.40–0.63	Estimated: 180g × 2.2–3.5 kg CO ₂ e/kg HDPE	-47–65% vs. current 1.2 EEIO
LVP/LVT flooring (Shaw EcoWorx)	m ²	5.2	Shaw Contract EcoWorx Resilient EPD 2023	Consistent with WARM v16 plastics
Ceramic tile (standard)	kg	0.78	ICE Database v3.0 (University of Bath)	More granular than WARM v16 inert
Ready-mix concrete (30 MPa)	kg	0.13	ICE Database v3.0	132 kg CO ₂ e/m ³
Polyethylene LDPE sheeting	kg	1.793	DEFRA 2024 (closed-loop recycling scenario)	Use as proxy for virgin LDPE sheeting
H ₂ O ₂ antimicrobial (active ingredient)	kg active	1.33	ACS Omega 2025 (anthraquinone process)	Lower than EEIO chemical proxy

Note on Tyvek: DuPont has not published an independent lifecycle assessment for standard Tyvek 400 coveralls. The value above is estimated from HDPE production emission factors. DuPont has commissioned an LCA for Tyvek 500 Xpert BioCircle (a recycled-content variant) claiming 58% reduction versus standard Tyvek, which implies a quantified baseline exists internally. The RCP will update this value if DuPont publishes the underlying LCA data.

Note on nylon carpet (DEFRA 2024): The DEFRA 2024 value of 5.40 kg CO₂e/kg for nylon carpet should be verified against the actual DEFRA 2024 full spreadsheet to confirm whether this represents virgin nylon production or a closed-loop recycling scenario. DEFRA 2024 uses AR5 GWP values throughout.

Factor Vintage and GWP Basis: Version Disclosure

RCP v1.0 uses the following factor vintages:

- **Electricity:** EPA eGRID 2023 (published March 2025)
- **Mobile combustion / vehicle fuels:** EPA 2025 Emission Factors Hub
- **Waste disposal:** EPA WARM v16
- **Refrigerant GWPs:** IPCC AR6 (2021)
- **Materials (non-EEIO):** ICE Database v3.0, EPD-sourced, DEFRA 2024
- **Materials (EEIO proxy):** EPA USEEIO v2.0
- **GWP basis:** AR6 GWP-100 for refrigerants; AR5 GWP-100 for all other gases (consistent with EPA GHG Inventory basis)

When factors are updated in patch releases, the factor vintage table updates accordingly. All RCP Job Carbon Reports should reference the `schema_version` field (RCP-JCR-1.0) which implicitly references the factor table version used at calculation time. For year-over-year comparisons, use the same factor vintage across both years unless a major correction justifies restating prior-year figures.

CONTINUE READING

- [RCP Proxy Estimation Guide](#)
- [RCP JSON Schema v1.0](#)
- [The 12 Data Points Every Job Ticket Needs](#)

SEE ALSO

- [Water Damage Restoration: Scope 3 Guide](#)

- [RCP v1.0 Full Framework Document](#)

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