

SUS-02: Global Warming Footprint, Maintenance

SUS-02: Percentage of cases where CO₂ eq normalized by hour for cases receiving halogenated agents and or nitrous oxide is less than CO₂ eq of 2% Sevoflurane at 2L FGF = 2.83 kg CO₂/hr or the Total CO₂ eq is less than 2.83 kg CO₂ for the maintenance period of anesthesia.

Measure Start:

- **Intubation.** If not available, then
- **Induction End.**

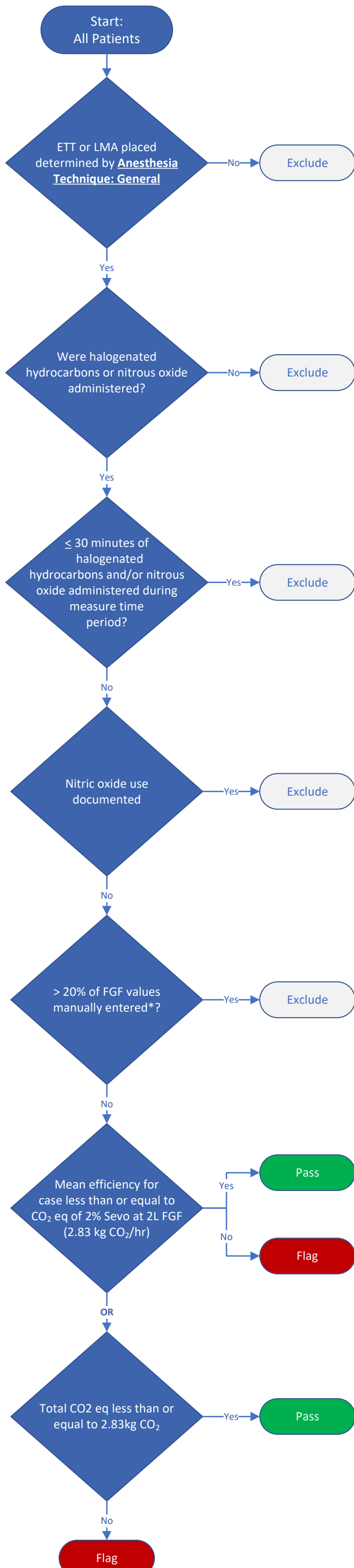
Measure End

- **Extubation Time.** If not available, then
- **LMA Removal.** If not available, then
- **Surgery End.** If not available, then
- **Patient Out of Room.** If not available, then
- **Anesthesia End.**

*Artifact values for flows and inhalational agents will be assessed and considered artifact if inside the following ranges:

Nitrous Oxide Flows	< 0.2 L/min
Nitrous Oxide Insp %	< 20%
Isoflurane Insp %	< 0.3%
Sevoflurane Insp %	< 0.4%
Desflurane Insp %	< 1.2%

Agent	Global Warming Potential ¹⁰⁰	Molecular Weight (MW) (g/mol)
Isoflurane	565	184.5
Sevoflurane	144	200
Desflurane	2450	169
Nitrous Oxide	282	44



CO₂ equivalents determined by calculating the pollutant total for the time period and dividing by the total number of minutes during the maintenance period.

Pollutant total: [Inspired agent concentration (%) X Fresh Gas Flow(L/min) X GWP₁₀₀]

1. Calculate CO₂ eq for each minute of Sevoflurane %, Isoflurane % and Desflurane %*
2. Calculate CO₂ eq for each minute of Nitrous Oxide % or Nitrous Oxide flows**
3. Sum CO₂ equivalents
4. Divide by total of included minutes: Total CO₂ eq / Total # of minutes
 - o Included Minute = minute within measure bounds, with both halogenated agent and flows are present
5. Multiple Total CO₂ eq/min X 60 = Mean CO₂ eq per hour

*CO₂ eq for Sevoflurane, Isoflurane, Desflurane (%)

1. Convert agent % to mLs of agent/min: (FGF (L/min) X 1,000 X agent %) / 100
2. Convert mLs/min to moles: agent mL / 24,400
3. Convert moles to mass: (agent moles X MW of agent) / 1,000
4. Convert mass to CO₂ eq: agent mass X GWP of agent

To calculate Mean Fresh Gas Flow:

1. Determine which flow values to include by identifying minutes where FGF and non-artifact inhaled agent or nitrous oxide are documented
2. Add all included FGF values and divide by the total number of included minutes

**CO₂ eq for Nitrous Oxide:

For cases with documented Nitrous Oxide % but Nitrous Oxide flow is not reported, then use Nitrous Oxide % and FGF:

- Divide Nitrous Oxide % / 100 = N
- Convert N to mLs/min: (FGF(L/min) X 1,000 X N)
- Convert mLs/min to moles: (N mL / 24,400)
- Convert moles to mass: (N moles X MW of agent) / 100
- Convert mass to CO₂ eq: N mass X GWP of agent

For cases with both valid Nitrous Oxide % and Nitrous Oxide flows reported, only Nitrous Oxide flow values will be considered (N₂O values reported as % will be ignored)

1. Convert Nitrous Oxide (L/min) to moles/min: Nitrous Oxide / 24.4 = Nmol
2. Convert Nmol to N₂O mass (kg/min): (Nmol X 44) / 1,000
3. Convert Nmass to CO₂ eq: Nmass X GWP