📘 CDC COURSE MANUAL / TDI Nitrox Gas Blender

📄 TABLE OF CONTENTS

1. Introduction

This training program covers:

• **TDI Nitrox Gas Blender**

The objective is to train students to:

• Safely handle oxygen
• Understand gas properties
• Blend nitrox mixtures correctly
• Analyze and document gas fills

All training is conducted in accordance with TDI Standards and Procedures

2. Prerequisites

Students must meet the following requirements:

• Minimum age: 18 years

Recommended (not mandatory):
• Nitrox Diver certification
• Basic understanding of MOD and gas limits

3. Course Structure

According to TDI standards:

• Minimum classroom time: 2 hours
• No confined or open water dives required

👉 This program is conducted as a 1-day intensive course including:
• Theory
• Practical blending
• Analysis training

4. Equipment Requirements

Students will work with:

Gas Equipment

• Oxygen analyzer
• Fill station (continuous flow system)
• Oxygen supply (100%)
• Air compressor system

Cylinder Equipment

• Scuba cylinders
• Pressure gauges
• Valve systems

Safety Equipment

• Oxygen clean components
• Fire-safe working environment

👉 Operational limitation:
• Blending up to EAN40 using continuous flow only

5. Theory

5.1 Responsibility of the Gas Blender

• Direct responsibility for diver safety
• Accurate documentation required
• Quality control of every fill

5.2 Gases of Diving

• Air (21% O_2)
• Oxygen (O_2)
• Nitrogen (N_2)

• Gas behavior under pressure

5.3 Oxygen Handling

Hazards:
• Fire and explosion risk
• High reactivity of oxygen

Causes:
• Contamination
• Rapid pressurization

Prevention:
• Clean systems
• Controlled flow rates
• Proper materials

5.4 Gas Production Equipment

• Compressors
• Filtration systems
• Cylinders
• Pressure gauges

5.5 Oxygen Analysis

• Calibration procedures
• Analyzer function
• Error prevention

6. Gas Blending Methods

(Theory – required by standard)

Students must understand:

• Continuous Flow Blending (Primary method)
• Partial Pressure Blending (theory only)
• Pre-mix systems
• Membrane systems

👉 Practical training is conducted using:
• Continuous Flow blending only

7. Practical Blending Procedures

Standard Procedure

1. Analyzer calibration (21% air)
2. Define target mix (e.g. EAN32)
3. Start airflow
4. Slowly introduce oxygen
5. Stabilize mixture
6. Monitor oxygen percentage
7. Stop at target value
8. Analyze cylinder
9. Record data

👉 Emphasis on:
• Stability
• Accuracy
• Repeatability

8. Oxygen Analysis

Students must:

• Calibrate analyzer before each session
• Analyze every cylinder
• Verify readings

Tolerance requirement:

👉 ±1% O_2 deviation

MOD Calculation

Formula: MOD = ((PO_2 / FO_2) - 1) × 10

Example:
• EAN32 → MOD ≈ 33m

9. Cylinder Handling & Documentation

Each cylinder must include:

• Oxygen percentage
• MOD
• Date
• Blender name/initials
• Verification

Proper procedures:

• Safe transport
• Correct storage
• Logbook completion

10. Course Program (1 Day)

Morning – Theory

Session 1
• Gas fundamentals
• Responsibility

Session 2
• Oxygen handling
• Equipment

Session 3
• Blending methods

Midday – Practical Setup

• Analyzer calibration
• System check
• Safety briefing

Afternoon – Practical Blending

Each student must:

👉 Blend 5 cylinders
👉 Analyze each cylinder
👉 Record all results

Focus areas:

• Accuracy
• Stability
• Proper documentation

Final Session

• Review results
• Error analysis
• Written exam

11. Safety & Emergency Considerations

Students must understand:

• Oxygen fire risk
• Contamination hazards
• Equipment failure

Key principles:

• Slow and controlled operation
• Clean working environment
• Never rush blending process

12. Graduation Requirements

Students must:

• Blend and analyze 5 cylinders
• Achieve accuracy within ±1% O_2
• Complete fill log including MOD
• Pass written examination
• Demonstrate understanding of all procedures

13. Certification

Upon successful completion:

• Students may blend nitrox gases
• No direct supervision required

📋 14. Nitrox Blending Log Sheet

📝 Student Information

Name: _____

Date: _____

🧪 Cylinder Log

Tank #	Target O_2 %	Measured O_2 %	Pressure (bar)	MOD (m)	Analyzer	Blender Initials	Verified

🔍 Analyzer Calibration

Time	Gas	Reading	Adjusted	Initials
	Air (21%)			

📌 Declaration

I confirm that I have received training in accordance with TDI Nitrox Gas Blender standards.

I have successfully participated in practical training including:
- Continuous flow nitrox blending
- Oxygen analysis procedures
- Safe handling of 100% oxygen for blending purposes

I have also received theoretical instruction in:
- Partial pressure blending methods
- Alternative gas mixing systems

I understand the responsibilities and risks associated with nitrox gas blending and confirm that all cylinders blended during this course were analyzed and documented correctly.

Student Signature: _____
Date: _____

Instructor Signature: _____