



## KISS GEM Level 1 Instructor

- ▶ Welcome and Course Overview
- ▶ The TDI Instructor
- ▶ Dive Leader Risk Management
- ▶ Methods of Instruction
- ▶ Business Side of Diving
- ▶ Teaching the TDI KISS GEM Level 1 Diver Program

The TDI KISS GEM Level 1 Instructor Program is a specific SCR instructor program based on the requirements of the unit and the manufacturer. If this is the first program an instructor is completing through TDI more time will need to be spent on the core topics listed below. Once an instructor has completed their initial TDI KISS GEM Level 1 program, or any initial TDI Instructor program, they will need only to focus on the course specific content for future programs.

### Objectives

**The object of this program is to:**

- Introduce the instructor to TDI
- Introduce the candidate to the TDI Instructor Guide and Student materials
- Demonstrate how to use the TDI KISS GEM Level 1 materials to train a new diver



- Teach the instructor “How to Conduct” the TDI KISS GEM Level 1 Diver program
- Demonstrate how to register and certify a new KISS GEM Level 1 Diver

## **Prerequisites for TDI KISS GEM Level 1 Instructor Program**

See the current TDI KISS GEM Level 1 Instructor standards for the prerequisites and requirements for this program.

## **Materials Required**

Teaching any program with outdated materials is just asking for problems. The trainer must confirm that their materials are current and each instructor has the current materials with which to teach the program.

## **Instructor Trainer**

- TDI Semi-closed Rebreather Diver Manual
- TDI Semi-closed Rebreather Knowledge Quest
- TDI Semi-closed Rebreather Instructor Guide
- TDI Semi-closed Rebreather PowerPoint Presentation®
- KISS GEM Level 1 manufacturer’s user manual
- TDI Instructor Trainer Manual

## **Instructor Candidate**

- TDI Semi-closed Rebreather Diver Manual
- TDI Semi-closed Rebreather Diver Knowledge Quest
- TDI Semi-closed Rebreather Instructor Guide



- TDI Semi-closed Rebreather PowerPoint Presentation®
- KISS GEM Level 1 manufacturer’s user manual

Note: Prior to beginning the program the instructor candidate should review all instructor and diver materials and complete all knowledge quests and final exams so they are completely familiar with the subject matter and the support materials to teach the TDI KISS GEM Level 1 Diver program.

**The topics to be covered are:**

- Welcome and Course Orientation
- The TDI Instructor\*
- Dive Leader Risk Management\*
- Methods of Instruction\*
- Business Side of Diving\*
- Courses a TDI KISS GEM Level 1 Instructor Can Teach

\*Core Topics: These core topics will be found in Part One of this manual; IT Information.

# Welcome and Course Overview

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## Paperwork

- Instructor Registration Form
- Personal Information
- Liability Release
- Medical Statement



## **Let's Get to Know Each Other**

### **Professional Staff**

#### **Participants**

- Your name?
- What type of technical diving experience do you have?
- Which technical diving activities interest you the most?
- Why are you interested in becoming a technical instructor?

### **About This Program**

#### **Course Objective**

- Develop the appropriate knowledge and skills that are expected of every dive professional

#### **Subject Areas**

- The TDI Instructor
- Dive Leader Risk Management
- Methods of Instruction
- Business Side of Diving

#### **Structure and Schedule**

- Independent Study
- Classroom Presentations
- Confined Water Training
- Open Water Training



## **Required Equipment**

- Items you'll need for this course

## **Any Questions?**

# **The TDI Instructor**

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Refer to Instructor Trainer Manual Part 1 Instructor Training Process  
Chapter 2-The SDI/TDI/ERDI Instructor

# **Dive Leader Risk Management**

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Refer to Instructor Trainer Manual Part 1 Instructor Training Process  
Chapter 3-Dive Leader Risk Management

# **Methods of Instruction**

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Refer to Instructor Trainer Manual Part 1 Instructor Training Process  
Chapter 4-Methods of Instruction



# Business Side of Diving

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Refer to Instructor Trainer Manual Part 1 Instructor Training Process  
Chapter 5-Business of Diving

## Teaching the TDI KISS GEM Level 1 Diver Program

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- Program overview
- Classroom requirements
  - Students are required to become familiar with: risks of semi-closed circuit rebreathers, pre-dive tests and checks, use of flow meters, scrubber packing, oxygen analysis, post-dive unit cleaning as they relate to the GEM. Since this course may be the first time a diver has been on a rebreather, it is best to explain the differences between open circuit equipment and semi-closed circuit as well as their breathing characteristics and how the GEM is different from other SCRs. An Instructor must be able to demonstrate instructor level knowledge on all topics and skills in the current TDI GEM Level 1 standards.
- Pool / confined water requirements
  - While a pool / confined water session is not required, an instructor may take this opportunity to introduce divers to the differences of rebreather diving in a controlled environment or conduct a skill evaluation to help the students become better divers. This is the ideal setting to conduct buoyancy skills, trim, equipment configuration and loop drills.
- Open Water Requirements



- Five dives with a minimum of 200 minutes of bottom time is required. If this program is conducted in conjunction with other allowed courses, the five dives plus the required number of dives from the other program is required. For the GEM dives it is best to take divers progressively deeper so they get a slower introduction to rebreather diving. The first couple of dives can be started in shallower waters so divers get a sense of how the rebreather performs and the differences from open circuit diving. This also allows an opportunity for the instructor to monitor the comfort level and abilities of the diver.
- Materials
  - Review all diver materials to make sure the instructor candidate is familiar with all diver materials and how they are supported by the instructor materials.
    - Diver Materials
      - Printed
- Required paperwork
  - Discuss in detail how the instructor should complete the required paperwork
  - The instructor candidate must be familiar with all forms and be able to answer any question a diver may have regarding the completion of those forms
    - Diver Training Folder
    - Waiver
    - Medical Questionnaire
- Complete a thorough review of the appropriate TDI Instructor manual including:
  - How to conduct:
    - Academic sessions



- Cover helpful hints on how to teach more involved subjects
- Pool/ Confined water sessions (if one is conducted)
  - Helpful hints on:
    - How to teach skills
    - Conducting an update / skill evaluation
    - Possible problems an instructor may experience
    - How to deal with those problems
  - Open water sessions
    - Helpful hints on:
      - How to conduct skills in open water vs pool/confined
      - Possible problems an instructor may experience in open water
      - How to deal with those problems

### **List of tips on how to teach various aspects of this program include:**

History and evolution of rebreathers – the most important part of rebreather history is to demonstrate to divers that the technology is not new and many people have tried and tested these products to ensure safety. The GEM is an important part of the history as it is an adaptation to prior SCRs in that it utilizes standard open circuit cylinders commonly found at diving destinations.

Practical mechanics of the system – because rebreathers are so drastically different from open circuit equipment it is good to explain exactly how a rebreather works and the differences to open circuit. Explain the constant flow of oxygen to replenish metabolized oxygen, how the scrubber scrubs gasses through chemical reaction and the exothermic reaction it has. Also how the GEM is adapted to any standard cylinder is also important to discuss.

Review of nitrox – since nitrox is a prerequisite to this course, this



should just be done as a review. If students will be using oxygen levels above 40% more time can be spent explaining those levels, 40-100%. At this point divers should be able to explain and understand a PO<sub>2</sub>, variable PO<sub>2</sub>s and set PO<sub>2</sub>s.

Gas Physiology – this again is a review as the basics are covered in the open water diver course and again in the nitrox course. Covering the gases that circulate in the loop will be a very important discussion because in open circuit dives these are not as much of a concern. An important one here is a CO<sub>2</sub> breakthrough and how it affects the diver.

Formula work and metabolic consumption – divers understand as the workload increases so do their respirations but they may not understand how that affects them on a rebreather. Provide examples of metabolic rate and oxygen consumed at low and high rates. This is a concept they would have never been exposed to.

Dive tables – all tables previously covered in other courses need to be reviewed with the addition of the oxygen metabolic table.

Dive computers problem solving – it is encouraged that all divers use dive computers and further a nitrox computer. It should be explained that divers set their PO<sub>2</sub> or plan their PO<sub>2</sub> exposure by the adjusted metabolic rate and not the O<sub>2</sub> percentage in the source cylinder.

Dive planning – planning a rebreather dive is nothing like planning an open circuit dive so lots of time needs to be spent on this topic. Divers need to know that scrubber duration as well as oxygen flow rates play a big role in the limits of their dives. These are two things they will have never encountered.

Reading tables

EAD

EAN

PO<sub>2</sub>

CNS

Analyzing cylinders



Reading tables

EAD

EAN

PO2

CNS

Verifying cylinder content – the source cylinder should be analyzed and labeled.

**List of academic / pool-confined water / open water topics for candidate to present:**

As well as the topics above the following skills topics should be presented.

Properly analyze gas mixture

Perform all pre-dive checks

Leak check and repair scenario

Counter lungs inspection and testing

Scrubber canister packing

Set-up and breakdown of unit

Bailout scenarios and recoveries

Proper cleaning of unit

O2 monitoring during dive

Advantages and Disadvantages of KISS GEM Level 1

Use of oxygen analyzers



## Scheduling Options for this program

Courses can be scheduled with a one to one ratio, as a group or scheduled in conjunction with other TDI courses. Each of these will require different time commitments and scheduling logistics. A course with one GEM diver will take less time than if combined with another TDI course with a group.

## Overview

The TDI GEM Level 1 Instructor program is comprised of classroom sessions and dives. One day should be allotted for the academic session with up to three full days for the dives.

If this program is taught with any of the other allowed instructor programs, two full days for the classroom should be scheduled and the appropriate amount of days for the dives if two dives per day are scheduled. There may be times when the course can be completed in less time but it is always good to allot an extra day or two for make-up time or weather.

## Classroom

You will need various pieces of equipment normally used for SCR diving as well as a complete GEM unit. The instructor must be able to demonstrate to instructor level quality all academic topics in the current TDI GEM Level 1 Standards.

## Dives

One confined water session of 60 minutes and five open water dives with a minimum of 200 minutes accumulated bottom time are required for the instructor course. These sessions could be completed over 2 days but it is best to build in an extra day for delays and make-up.



## **Knowledge Quest Review Questions if applicable**

No instructor level Knowledge Quest is available for this program, although the candidate should complete the diver level Knowledge Quest so they are familiar with the information.

## **Final Exam**

No instructor level final exam is available for this program, although the candidate should complete the diver level final exam so they are familiar with the information.

