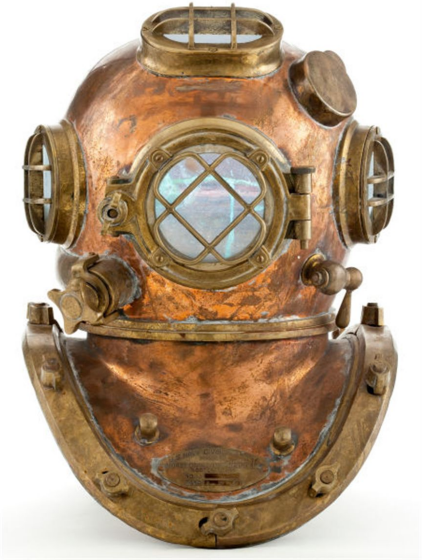
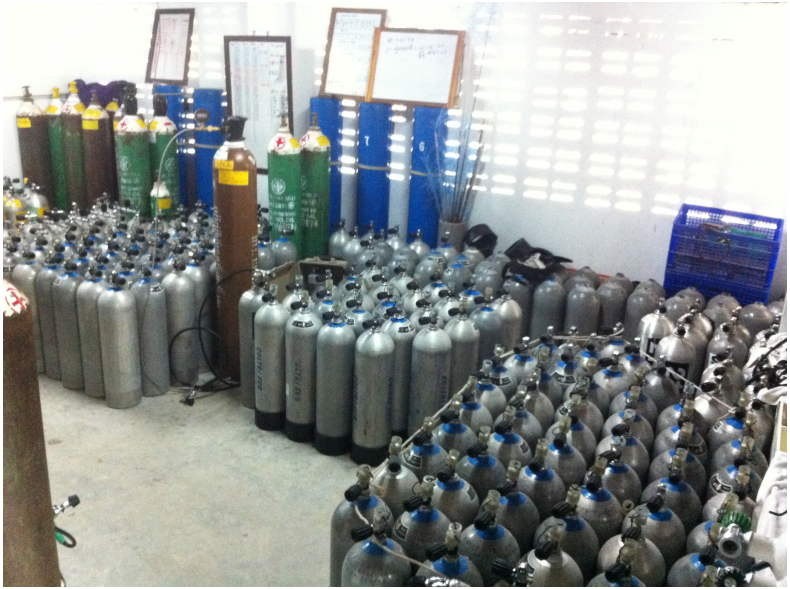
Scuba Diving Equipment

- Tanks
- Cylinders Inspection
- Valves
- Regulators
- Gauges
- Nitrox



Tanks



Tanks

Steel

Thinner walls, less buoyant, more corrosion

Aluminium

Thicker walls, more buoyant, less corrosion

Size

Ban's (S80) = 11.1L aluminum tank

Reference

PADI Encyclopedia 3-49

Tanks

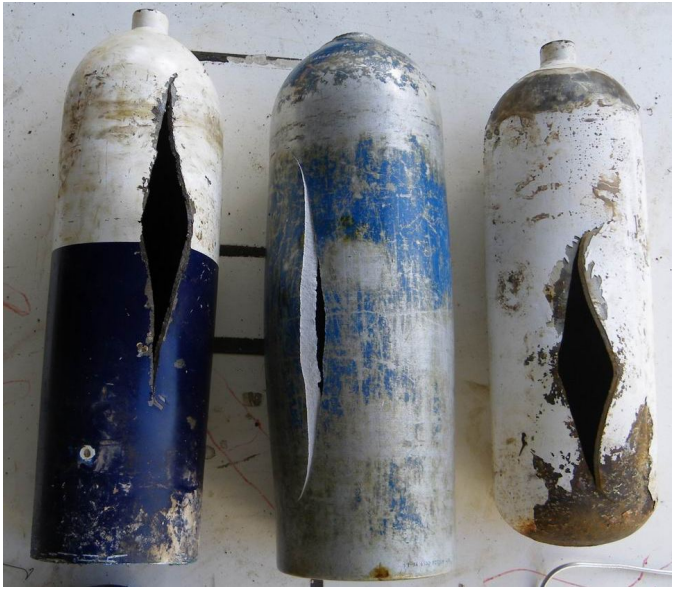
Markings

- Serial number
- Steel or aluminium alloy
- Working and test pressures
- Manufacturer
- Hydrostatic inspection date
  - "+" allows overfilled by 10%

Reference

PADI Encyclopedia 3-52

Cylinders Inspection



Visual Inspection

Why?

- Industry Standard
- Check tanks between hydrostatic inspections
- Avoid excessive corrosion around the valve
- Usually once a year (but national standards may vary)

Visual Inspection

How?

Remove valve
Check inside with bright light
Inspect outside for unusual impacts or marks

Hydrostatic Inspection

Why?

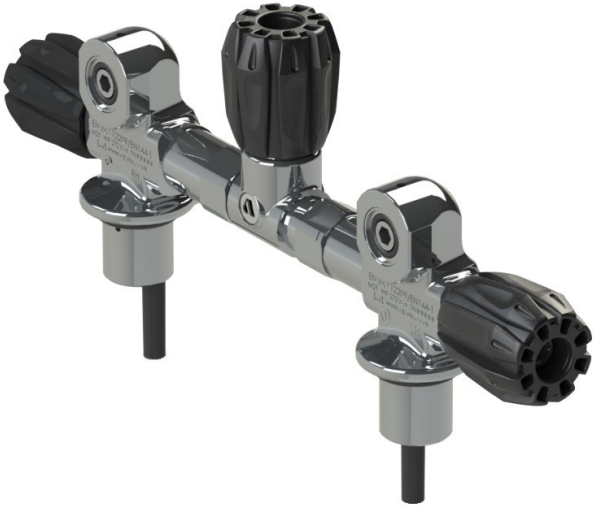
- Every few years (follow National standards)
- Exposed to high temperature (>82°C)
- Damaged due to impact
- After tumbling due to internal corrosion
- Empty for 2 years or more

Hydrostatic Inspection

How?

- Fill tank with water
- Immerged in water chamber
- Pressurize above working pressure ($\approx 5/3$)
- Mesure volume displacement under pressure
  - (metal fatigue)
- Check volume displacement after the test
  - (metal elesticity)

Valves



Valves

K-Valve

- Most common valve
- Simple ON/OFF valve
- Burst disk between 125% and 166% of the working pressure

J-Valve

- Lever used as a reserve
- Spring close the valve at around 20-40 bar
- Lever must be open when filling (lower position)

Valves

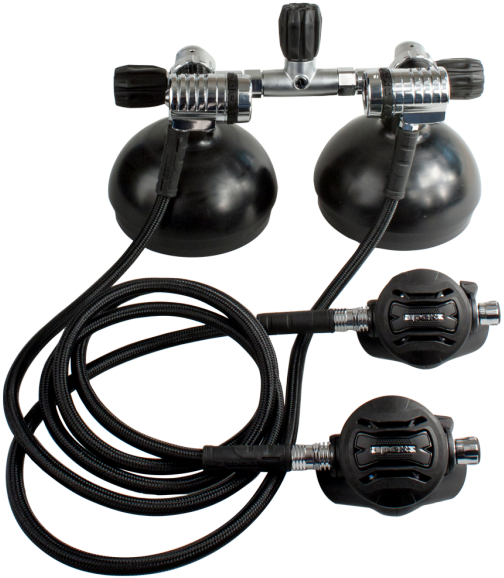
DIN

Regulator screws inside the valve
Stronger, used for overhead diving
Can be used up to 300 bar

Yoke, A-Clamp, Int

Screw holding the regulator against the valve
o-ring on the valve
Can be used up to 232 bar

Regulators



Definitions

Upstream

Open against the air flow

Downstream

Open with the air flow

Demand valve

Air is given only upon inhalation

Fail safe design

Downstream design
Will freeflow if the regulator freeze

First Stages

Types

- Unbalanced Piston
- Balanced Piston
- Balanced Membrane

Reference

PADI Encyclopedia 3-60 and 3-62

First Stages

Aims

- Reduce High Pressure to Intermediate Pressure
- Fail safe design
- Balanced design:
  - Same air flow and IP throughout the dive
  - IP doesn't change with tank pressure
  - Air flow stable with 2 divers
- Environmental seal
  - Prevent regulator from freezing
  - Avoid freeflow in cold water

Second Stages

Types

- Unbalanced Upstream (obsolete)
- Unbalanced Downstream
- Balanced Downstream
- Servo or pilot valve

Reference

PADI Encyclopedia 3-61

Second Stages

Aims

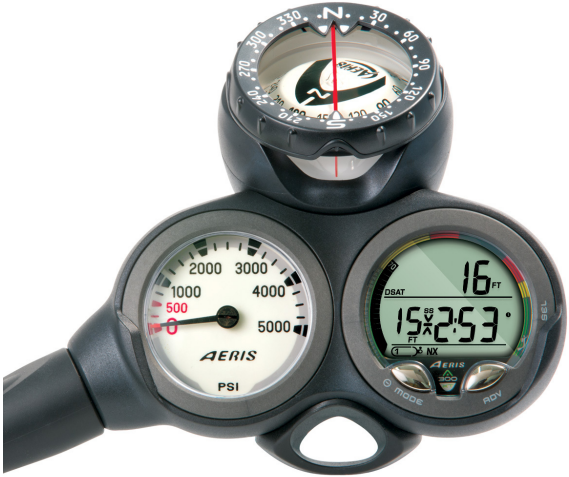
Reduce Intermediate Pressure to Ambiant Pressure
Not always a fail safe design!
Balanced design:

Same inspiration effort throughout the dive
Effort doesn't change with IP or depth

Principle:

Classic: On inhalation, a diaphragm flexes and open a valve
Servo: the diaphragm opens a pilot valve which opens the main valve

Regulators



Gauges

Submersible Pressure Gauges (SPG)

- Open Bourdon tube
- Spiral which expands under pressure

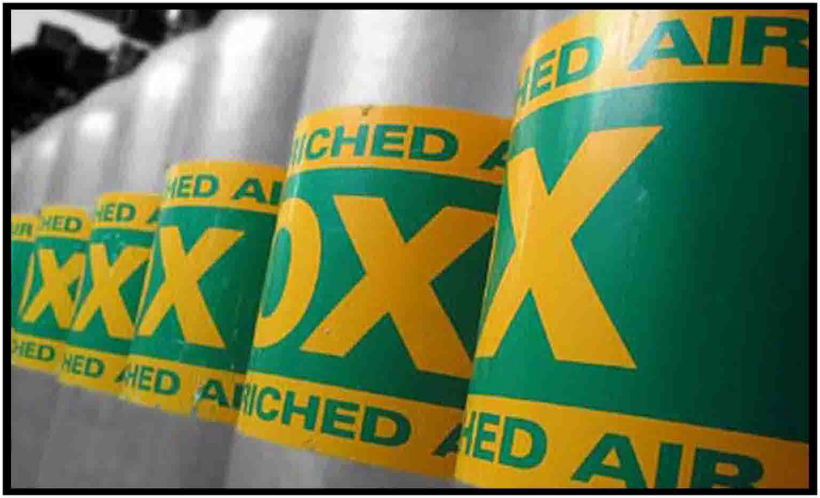
Depth gauge

- Capillary gauge (water moving in a transparant tube)
- Open Bourdon tube
- Oil-filled Bourdon tube
- Diaphragm

Computer

- Transducer converting the pressure in electrical current

Nitrox



Nitrox

Equipment compatibility

- Follow manufacturer guidelines
- O2 clean equipment with >40% oxygen
- Follow national regulations

Procedures

- Mix analysed by the diver
- Content sticker on the tank