



# **LIST FOR CHEMICAL AND BIOLOGICAL**

# **EMERGENCY SPILL EQUIPMENT**

**(Recommended)**

## TABLE OF CONTENTS

	<u>Page Nos.</u>
1. Personal Protective Equipment	2
2. Respiratory Equipment	4
3. Detection and Monitoring Equipment	6
4. Response Equipment	7
5. Decontamination Equipment – Access Control	8
6. General Equipment	9
7. Capital Equipment (Share basis)	10
8. Training & Personnel	11
9. Transport	11

## PERSONAL PROTECTIVE EQUIPMENT

TYPE	NO	COMMENTS
<i>Level A (Gas Tight)</i>	8	Limited life suits preferred, but multi use suits acceptable if decontamination can be verified. Suits to have decontamination line fitted and have points for securing torches. No requirement for fire retardant material. Manufacture's include, Drager, Respirex, Trelleborg etc
<i>Level B (Liquid Tight Suits)</i>	8/16	Can be either limited life (Tyvek F) or multiuse. The important issue is that of compatibility. The suits must have sealable zips, hood and cuffs to ensure a liquid tight fit. Consideration should be given to the use of encapsulating suits (not gas tight) to protect the SCBA from contamination.
<i>Level C Suits</i>	8/16	These suits need to be able to protect the worker from accidental contact with the hazardous substance. A high resistance fabric such as those used for Level B would be recommended to ensure safety.
<i>Level C Suits</i>	24	Tyvek Pro-Tech or similar disposable suits to protect the worker in a low risk environment
<i>Training Suits (Level A)</i>	2	Recommended to protect the operational equipment.
<i>Chemical Boots</i>	8	Steel toe-capped chemical resistant boots, the industry standard is the Bata Hazmax range.
<i>Safety Boots</i>	8	As above but lower resistance to be worn with level C/D clothing
<i>Overshoes</i>	24	Chemical resistant overshoes such as Tyvek F to protect the expensive PPE and reduce contamination carryover

<i>Chemical Cloves</i>	24/24	A mixture of glove types to give maximum compatibility, good examples include Barrier and Nitrile. The manufacturer must be able to provide good information on material compatibility (See Ansell website)
<i>Working Gloves</i>	24	Leather Palmed for use over the chemical resistant gloves and general working.
<i>Chemical Gloves</i>	2	Cryogenic gloves for working with very cold temperatures, such as escaping gases.
<i>Chemical Cloves</i>	100	Disposable gloves for inner protection and casual use.
<i>Full Face Visors</i>	6	For wearing with hard hat and to protect against accidental splash contact.
<i>Chemical Goggles</i>	24	Gas tight goggles
<i>Flame retardant clothing</i>	6	
<i>Head Protection</i>	12	
<i>Ear Protection</i>	6	

## RESPIRATORY EQUIPMENT

TYPE	NO	COMMENTS
<i>SCBA with Cylinder</i>	8	Self Contained Positive pressure breathing apparatus with cylinder. Carbon Fibre cylinders are available but need protection. It is considered at this time that steel cylinders would be preferable. Duration of 30mins min for each cylinder based on normal consumption. Sets to have Decontamination line. Give consideration to face masks with radio fitting capability to improve communications
<i>Spare Cylinders</i>	16	30mins duration per cylinder.
<i>Airline Breathing Apparatus with cylinder</i>	4	For use on an external airline or within the Level A Suits when working off an external air source.
<i>Full Face Respirators</i>	8	Canister or Cartridge variety compatible with organic and particulate filters
<i>Organic Filters</i>	16	Maximum resistance type is preferred.
<i>Particulate Filters</i>	8	HEPA type filters
<i>BA Control Board</i>	1	Stage 1 Breathing Apparatus control board for entry teams, with clock and user clips
<i>Breathing Air Compressor</i>	1	Portable unit or immediate access to a suitable device with the appropriate connections.
<i>Industrial Air Compressor</i>	1	85Cbm or higher for use with air driven pumps and Respiratory protection
<i>Medical Filter unit</i>	1	For use with the industrial compressor

<i>Extension Airlines</i>	8	50m lengths of anti static hose
<i>Extension Airlines</i>	4	3m lengths of anti static hose
<i>Y Piece connection</i>	2	For use with the above.
<i>Air Resuscitation Equipment</i>	1	For rescue purposes
<i>Oxygen Resuscitation Equipment</i>	1	For medical use in a non-hazardous area
<i>Portable Trolley Breathing set</i>	1	Complete set with cylinders for use with the compressor system or as an emergency back up for breathing systems.

## DETECTION AND MONITORING EQUIPMENT

TYPE	NO	COMMENTS
<i>Combustible gas meter</i>	1	Either a stand alone unit or part of a multigas unit capable of detecting O <sub>2</sub> , H <sub>2</sub> S in addition
<i>Oxygen Meter</i>	1	See above
		Or in place of the above a multigas detector as below
<i>Multi Gas detector</i>	2	Capable of remotely sensing LEL, H <sub>2</sub> S, O <sub>2</sub> and selected vapours.
<i>Detection Tubes</i>	1 Set	Drager tubes or similar to cover a range of chemicals appropriate to the location.
<i>Photo- Ionisation detector</i>	1	For the detection of Volatile organic compounds, useful when contaminant is not known. Used extensively by fire departments around the world.
<i>PH detection</i>	1	Either PH Papers or an automatic detector.
<i>Personal Oxygen Detectors</i>	4	To be worn by response personnel in confined spaces.

## RESPONSE EQUIPMENT

TYPE	NO	COMMENTS
<i>Chemical Pump</i>	1	2.5inch Stainless Steel air driven diaphragm pump with PTFE or Teflon seals
<i>Acid Pump</i>	1	As above but of a plastic type material
<i>Hand Pump</i>	1	Stainless Steel for drum transfer.
<i>Portable Hose</i>	100m	PTFE lined hose for use with the air driven pumps. To be in max 10m lengths. Connections to be Stainless Steel
<i>Earthing set</i>	1	Cable, clips and earthing rods for securely earthing the pumping set-up
<i>Salvage Drums</i>	6	For 45 gal/ 220L Drums, Polythenene screw top
<i>Overpack Drum</i>	6	As above
<i>Overpack Drum</i>	6	Lined metal drums for storing waste.
<i>Overpack Drums</i>	4	30L poly screw top for waste in small quantities
<i>IBC Tanks</i>	2	1000L HDPE tanks for storing bulk waste or product, connections to be compatible with the 2.5inch pumps
<i>45gal drums</i>	6	Clean and empty 45 gallon drums of steel and/or HDPE construction for transferring substances
<i>Neutraliser</i>	6	Each of 25kg bags of Acid and Base Neutralizer, the ideal product will change colour on neutralizing the substance.
<i>Container Sealant</i>	2	Packs of putty suitable for temporary repair of a damaged container, examples include “Dammit and Plug-n-Dyke”
<i>Sorbent Boom Large</i>	10 Packs	Both Hydrocarbon and Chemical sorbents are required and a minimum stock of 6 is recommended for confinement and recovery operations. It is essential that replacement stocks can be obtained quickly.
<i>Sorbent Boom Small</i>	10 Packs	As above
<i>Sorbent Pads</i>	2 Packs	As above
<i>Sorbent Rolls</i>	1	As above



## DECONTAMINATION EQUIPMENT- ACCESS CONTROL

TYPE	NO	COMMENTS
<i>Wash down tank</i>	1	Collapsible tank such as Vikoma Rapide for large scale washdown
<i>Small tanks</i>	3	Small capacity tanks (paddling pool) for individual washdown
<i>Back pack Sprayer</i>	2	For wash down of contaminated personnel and equipment
<i>Pressure washer</i>	1	Petrol or Diesel drive with lance for high pressure, low volume flushing
<i>Buckets with lids (Large)</i>	4	For disposal of large items
<i>Buckets with Lids (Small)</i>	12	For disposal of other items
<i>Plastic Sheeting</i>	1 Roll	Heavy duty lining such as Visqueen for lining the decontamination area and covering contaminated equipment
<i>Tape/ Barriers/ Cones</i>		Sufficient to control the site of operations.
<i>Brushes/ Brooms</i>		At least 12 to cover the operation
<i>Decontamination Shower</i>	1	These all encompassing showers can be purchased but generally require a large volume of water, this would be suitable on a vessel or in a port.

## GENERAL EQUIPMENT

TYPE	NO	COMMENTS
<i>Portable Generator</i>	1	
<i>EX Lighting</i>	4	For illuminating the hazardous zone 500W
<i>Non Ex Lighting</i>	4	For illuminating the support zones 500W
<i>Hand Lights</i>	12	EX rated torches for use in a hazardous environment
<i>Portable Radios</i>	6	Ex rated for use in hazardous zones.
<i>Wind Indicator</i>	1	
<i>Hand Tools</i>	1	Spades, Picks, Shovels, Brooms, spanners, hammers etc
<i>Sample Jars</i>	12	Metal and Glass type for sample taking
<i>Eye Wash Stations</i>	2	
<i>Fire Extinguisher</i>	4	20lb Dry Powder
<i>Fire Extinguisher</i>	4	Foam
<i>First Aid Kit</i>	2	Suitable for Chemicals and Burns.
<i>Binoculars</i>	1	
<i>Rope</i>		For lowering and Lashing purposes

### CAPITAL EQUIPMENT (SHARE BASIS)

TYPE	NO	COMMENTS
<i>Salvage Pumps</i>	2	Portable stainless steel salvage pumps with hydraulic drive, suggest Framo TK 80 type pump which is easy to handle
<i>Power Packs</i>	2	Power pack for the TK 80, suitable for use in a hazardous environment
<i>Transfer hose</i>	200m	4" transfer hose for use with TK 80
<i>Reducers</i>		A collection of reducers to enable the pump and hose to be used onboard vessels.

## Training & personnel

It is recommended that a team of at least 10 trained personnel be available at all times, this can be achieved by pre-identifying a larger pool of personnel and providing the necessary training in equipment and operational procedures. It would be necessary to ensure that all personnel have at least 2 days familiarization per year on the equipment and operational procedures. This would involve theory and practical.

## Transport

Consideration should be given to fitting out a dedicated command and control vehicle as an operations centre. General transportation needs can be addressed as required. This Command and Control vehicle can be used with any type of Marine Emergency.

-----

