



## Risk Element

- Explosion;
- Asphyxiation;
- Refrigerant burns;
- Injury when moving cylinder and plant;
- Environmental damage,
- Legal obligation to ensure the cylinder is not overfilled.

## Precautions to Eliminate/Reduce Risk

- Use of correct plant with qualified and trained personnel;
- Read COSHH and J & E Hall technical information on substances and before proceeding;
- Use the correct recovery cylinders and make sure they are not damaged;
- Use the correct quantity of recovery cylinders for the task;
- Use accurate weighing scales, preferably electronic;
- Do not overfill or exceed the maximum fill weight for the cylinder;
- Use correct protective equipment and clothing;
- Use correct mechanical handling equipment;
- No smoking, heat source or naked flame.

## Action in an Emergency

- Shut off leak and evacuate area, if there is no risk;
- Switch off electrical supply;
- Remove cylinders from heat source, keep cylinders cool;
- General first aid in cases of accident.

## Maximum Fill Weights

- A maximum fill weight is displayed on the side of the cylinder as a guide;
- The recommended maximum fill weight for recovered refrigerant is 80% of the virgin product quantity embossed on the neck of the cylinder;
- Not all cylinders are the same size so take note of the values on the cylinder;
- Use the virgin fill values embossed on the cylinder to calculate the maximum fill weight for the refrigerant being recovered;
- If the refrigerant is not on the cylinder, do not exceed the maximum fill weight of the cylinder;
- The tare weight of the empty cylinder can be found stamped on the cylinder.

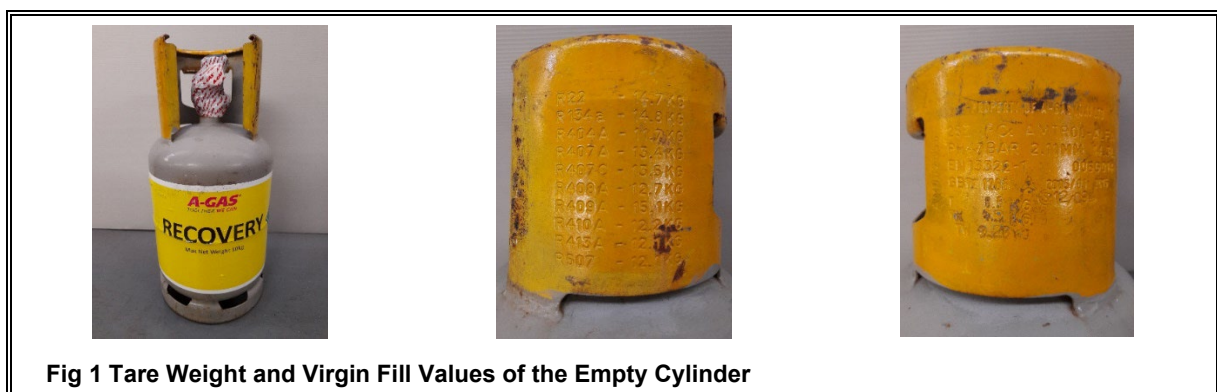


Fig 1 Tare Weight and Virgin Fill Values of the Empty Cylinder

## Flammable Refrigerants

- Flammable A2L refrigerants must only be recovered into cylinders designated for use with flammable refrigerants;
- Cylinders for flammable refrigerants will have a painted red top and the correct labelling;
- Cylinders for flammable refrigerants also have left hand thread DIN 477 connections.



## Cylinder Safety

- Do not overfill cylinders;
- Overfilling a cylinder can lead to “hydraulic lock” which is very hazardous and may lead to cylinders rupturing;
- An overfilled cylinder will be refused collection on safety grounds;
- Do not use excessive heat to remove the refrigerant where a cylinder is used as a temporary refrigerant storage vessel during maintenance operations;
- If the cylinder requires heating to remove refrigerant use an approved cylinder heating device;
- Do not overheat the cylinder.

## Safe Working Method

Make sure of the following before attempting procedure:

- Become familiar with the equipment;
- Establish refrigerant type to be removed. (If no identification, Pressure Temperature Relationship may have to be used);
- Correct number of recovery cylinders are available;
- That the cylinders to be used are designated for recovered refrigerant and labelled for that refrigerant;
- All necessary paperwork such as labels and transfer notes are to hand;
- Make sure recovery equipment is in working order;
- Make sure a set of weighing scales is available preferably electronic and in good working order, with site calibration (zeroed at point of use);
- Make sure all hoses are complete and are all in good order;
- All personal protective equipment is available and being used correctly;
- Mechanical Handling equipment is available if required for handling refrigerant cylinders;
- Check recovery / reclaim cylinder seal is not broken and the shut off valves are in good working order;
- Ensure that empty recovery / reclaim cylinders are either evacuated or cooled before recovery occurs;
- Pump down refrigeration system if possible;
- If “Pump Down” is not possible, it may save time to make a manifold so that refrigerant can be removed from various parts of the system;
- Make sure that cylinder is situated on the scales before recovery takes place and the scales zeroed / calibrated to enable accurate monitoring of the refrigerant kg;
- Supervise recovery at all times, by a competent person;
- Start recovery machine and operate in accordance with manufacturers instructions;
- Take into account that refrigerant/oil moistures have a lower density than pure refrigerant which will reduce cylinder capacity;
- Do not exceed maximum fill of the recovery/reclaim cylinder for the given refrigerant as detailed by the manufactures cylinder;
- Do not exceed that maximum working pressure of the cylinder, even temporarily;
- When cylinder filled correctly and process completed, make sure cylinders are removed from site promptly by a registered waste carrier;
- Recovered refrigerant should not be charged into another refrigeration system;
- Complete the documentation to ensure refrigerant is to be disposed of in accordance with current Environmental Legislation;
- Label equipment in line F-Gas legislation stating that it has been decommissioned if applicable and emptied of refrigerant. The label must be dated and signed by the engineer completing the works.