Manufacturing process

1. VCM is the key feedstock for the production of PVC at the Newton Aycliffe production facility. VCM is polymerised into PVC by joining small molecules (monomers) together to make long chains (a polymer). The conversion rate of VCM to PVC in the polymerization process is close to 100%. The polymerization is a batch process which takes place in PVC reactors. As stated above, the production of S-PVC requires the suspension of VCM in water with an initiator.

2. VCM is delivered to PVC production plants by a variety of methods (pipeline, rail, road and ship) both within Europe and worldwide.

3. PVC can also be produced through an integrated chain of processes, in which ethylene and chlorine constitute the two main initial inputs.

4. Ethylene is chlorinated to produce ethylene dichloride (EDC) which is then transferred into VCM by thermal cracking. PVC is then made by the polymerisation of VCM.

   In the case of an integrated chlor-alkali process, the PVC production process would follow the following three steps:

   - Ethylene is chlorinated to produce EDC. The direct chlorination of ethylene requires about 300 kg of ethylene and 725 kg of chlorine per tonne of EDC.
   - EDC is then transformed into VCM by thermal cracking. In principle, the production of 1 ton of VCM requires about 472 kg of ethylene and 600 kg chlorine.
   - VCM is subsequently polymerised into PVC by joining small molecules (monomers) together to make long chains (a polymer). The conversion of VCM to PVC in the polymerization step is close to 100%, but about 7% of the raw material is lost in the entire production chain. The polymerization is a batch process which takes place in PVC reactors.

5. The production process in the UK is not this full Chlor-Alkali process but the polymerisation of VCM to PVC. Exporting producers in China, South Korea & Mexico are both Chlor-Alkali processers and VCM processors.