

# CASE STUDY

## ROOFCLIX

LL Hengelo

## PLASTCHEM

The Netherlands

## CPVC/UPVC BLENDING

### APPLICATION:

Roof tile

### PlastBlend technology:

- Easy to process
  - Can be processed with current machinery
- Most downstream equipment can be used
  - Can be co-extruded with other materials for example TPU and flexible UPVC
- Variety of finishes available

## ROOFCLIX AND UPVC/CPVC BLENDS: A CASE STUDY

### Putting Stress on UPVC

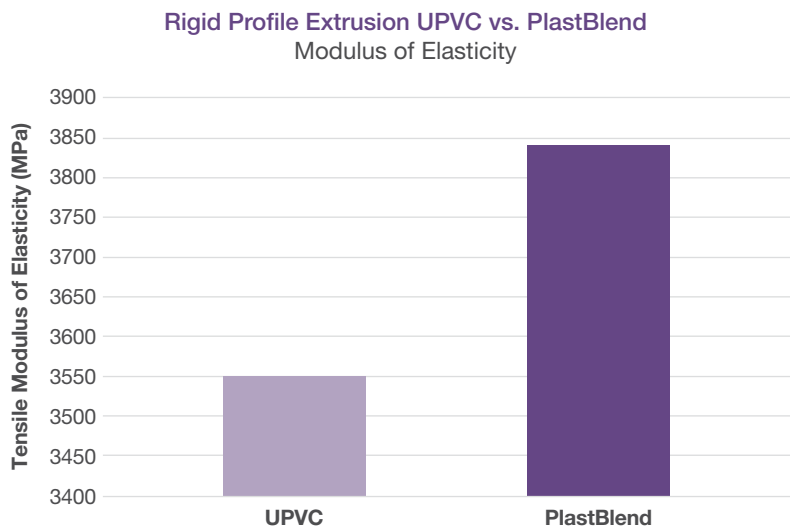
PlastChem are specialised manufacturers of Plastic Compounds including Rigid and Flexible PlastBlend compounds for heavy duty indoor and outdoor applications. Due to the recent escalation of climate change and increasing hot weather conditions, materials were reaching temperatures too close to the HDT (Heat Deflection Temperature, or Heat Distortion Temperature) of standard PVC compounds which caused distortion and deformation for outdoor profiles especially when extruded in darker colours. This threatens a material's integrity, when the polymer becomes increasingly likely to deform under pressure. Weakness is caused in particular by internal stresses and a lower modulus of elasticity (stiffness.)

### Enter PlastBlend

PlastChem began working with TempRite® Engineered Materials to develop a CPVC/UPVC blend in order to achieve the following:

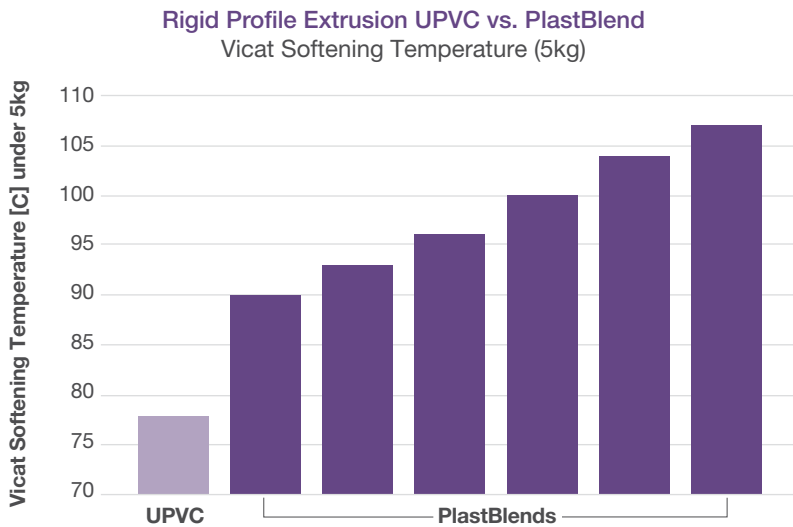
- Increased Vicat softening temperature
- Reduction of internal stresses
- Increase of rigidity to maintain strength at higher temperatures

### Modulus of PlastBlend High Performance Compounds vs. UPVC



Use of PlastBlend high performance compounds gives higher rigidity.

## Vicat of PlastBlend High Performance Compounds vs. UPVC



Use of PlastBlend high performance compounds gives higher heat resistance.

There has also been an increasing demand for higher standards of fire safety classification throughout the manufacturing world; this was an opportunity for PlastChem to respond to this strongly.

PlastChem's new blend of CPVC and UPVC can achieve a higher fire classification up to BS1D0. This is a standard not normally associated with ordinary UPVC.

This new blend (manufactured under the name PlastBlend) has gone on to be used amongst other applications, in profiles for interior and exterior walls and sidings thanks to its higher fire safety rating, along with a few added advantages.

The PlastBlend CVC/UPVC compound has an E modulus of approximately 3700 MPA. Historically, this was only possible using a blend of PVC and glass fibres. However the CPVC/UPVC blend is a lot safer to use, and causes less wear and tear on associated materials and equipment.

These are just some of the full range of benefits when processing PlastBlend technology:

- Easy to process
- Can be processed with current machinery
- Most downstream equipment can be used
- Can be co-extruded with other materials for example TPU and flexible UPVC
- Variety of finishes available

During application, these are some of PlastBlend's additional advantages:

- Temperature and fire resistance
- Improved properties in flexible applications
- Better printing performance
- Higher resistance to corrosive chemicals

Following this success, PlastChem then went on to work with Insigne to develop a new and improved version of their innovative roof panelling system, RoofClix.

### RoofClix: The Brief

RoofClix are an interlocking roof panelling system, designed to help regulate temperatures inside dwellings.

As our dependence on solar panelling technology has grown over the years, RoofClix were faced with a challenge. On a typical solar panelling system, temperatures can reach up to 80°C. In order for solar panels to work, they must be able to absorb heat efficiently.

However, standard UPVC only has an operating temperature of up to 60°C. Heat distortion is therefore an increasing threat to panelling systems that rely solely on PVC.

RoofClix required a new blend of polymer that would achieve two objectives:

- Increase HDT performance and dimensional stability
- Achieve a higher fire classification to enable compatibility with solar panelling

In order for residents to insure solar panelling systems, they must provide adequate fire classification certificates for their homes. In the case of RoofClix, customers require a T1 certificate.

Upgrading from a standalone UPVC solution to PlastChem's CPVC/UPVC blend with 70% CPVC content was therefore a natural solution.

### PlastBlend and RoofClix

Development began on the RoofClix panelling solution with the PlastBlend CPVC/UPVC compound. Roofing panels were processed without any issue; however, for the collaboration to be declared a success, a fire test was required.

The new roofing tiles and connecting pieces were submitted to Warrington Gent for a fire certification test. The new RoofClix system has now received the Broof (T1) classification in accordance with BN13501-5: 2016.

### The Results

Thanks to the improved stability of the RoofClix system, processed using the PlastBlend compound with CPVC, this innovative roofing technology is able to realise its potential as a major contributing factor to an improved residential environment.

- White interlocking panelling reflects up to 70 to 80% of the sun's radiation
- Ventilated cavity preserves shade temperature and helps to regulate temperatures in the structure below
- Lifespan of residential roofing is extended thanks to no more UV corrosion



Solar panelling system installed on rooftop mounted with RoofClix panels.

The new RoofClix compound also delivers major savings to solar panel users:

- Increased solar panel lifespan thanks to sturdier surface, Creating higher ROI
- Less repairs required to rooftop layer thanks to protective layer of panels
- Fireproof layer of RoofClix panels protects the surface from malfunctioning solar panels, should they ignite (only the panels closest to the fire may need replacing)
- Better overall fire safety on residential rooftops (in the Netherlands for example, where a flat roof tops are often made from flammable material)
- Reduced dependence on air-conditioning and heating systems throughout the year

### Working with CPVC

As the PlastBlend and RoofClix collaboration demonstrates, CPVC/UPVC blends not only boost the performance and safety characteristics of many materials, they also help to enhance the performance and safety features of the structures they inhabit.

In this case, solar panelling is made more efficient and safer for the end user when mounted on the new and improved RoofClix roofing panels.

Visit our website to find out more about the application of TempRite CPVC in heavy duty outdoor applications.

<https://www.lubrizol.com/Engineered-Materials/EMEA>

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