**esARC Option Note**

**ADU: Automatic Dosing Unit**

The **Automatic Dosing Unit comprises**:
- High Pressure Syringe Pump operating up to 300bar
- Dosing resolution 0.005 to 20ml per minute
- Dosing reservoir activated by temperature, pressure or self-heat rate
- Integrated fluidic control software
- Priming accessories and associated tubing
- Available Syringe Options:
  1 x 10ml syringe (50μL per/min upto 10ml per/min)
    Pressure 300bar
  1 x 20ml syringe (100μL per/min upto 20ml per/min)
    Pressure 150bar

The ADU is designed to allow the addition of a reagent to the cell inside the ARC during the test. This allows dosing at a pre-equilibrated elevated temperature and pressure conditions.

The unit consists of a peristaltic dosing pump (Fig 2 –3) operating up to 400°C/400bar, with dosing resolution 0.001 to 10ml per minutes and flow reproducibility greater than 0.1%.

The unit contains large volume cells, dosing reservoir, the associated tubing and the control software. The dosing syringe is controlled by the esARC software and will dose depending on certain predefined triggers at the software-set dosing rate.

Figure 3 shows the Dosing pump in relation to the esARC calorimeter.
Control of the automatic dosing unit (ADU) is incorporated into the esARC control software. Figure 5 shows the set-up of the ADU in the test set-up and the Figure 4 will show real time data as the dosing occurs. This plot will show dosed amount (ml) against time.

Dosing data is contained within the ‘.DAT’ file and can be analysed using THT ArcCal+ software.

Example: Acetic Anhydride dosed into Methanol
The system was heated to 50°C before dosing commenced. 10ml of Vinyl Acetate was dosed into near 30 g of Methanol. The reaction was then tracked adiabatically until completion. The system was stirred throughout using the ASU.

NOTE: The OSU must be purchased with this option