



## AMT International, Inc.

**“Leader in Advanced Mass Transfer Technology”**

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# Technical Bulletin #401: **ADVANCED DOUBLE STAGE (ADS) FILTER IN AROMATICS PLANTS** *Patent Pending*

## BACKGROUND

Sulfolane is widely used as an industrial solvent and often used as liquid-liquid extraction solvent to recover high purity aromatic hydrocarbons from pyrolysis gasoline, reformat or coke-oven oil feedstocks. It is generally considered to be non-corrosive to carbon steel.

However, in the course of the extraction process, impurities, either from upstream processing or from thermal or catalytic decompositions of the solvent to acidic compounds can cumulate and concentrate in the sulfolane. These impurities, in the form of small particles of iron-oxide and polymers can lead to significant corrosion rates to the processing equipment used in the extraction process and, if not remedied, result in serious operation and safety problems.

Several approaches have been used to combat this problem. The Solvent Regenerator is commonly used to remove the iron particles and polymer accumulated in the solvent - at the expense of energy. The corrosion inhibitors such as Monoethanolamine (MEA) can also be regularly added to control the PH value of the solvent as a way to control corrosion. The in-line filter is also frequently used but with limited effectiveness.

As a part of AMT's process and equipment know-how in aromatics recovery, AMT's field-proven, high efficiency **Advanced Double-Stage (ADS) Filter** offers a superior substitute to the conventional in-line filter to effectively remove the impurity particles, extend solvent life-span, and lower operating and maintenance costs.

## EQUIPMENT DESCRIPTION

When solvent is pumped through the in-line ADS Filter, most iron particles are removed in the first filtering stage via the specially designed cage; the finer polymers are then collected through the second stage basket. From the double-stage filtering, the impurities in the solvent can be effectively separated, removed and disposed.

## ADVANTAGES

Comparing with the typical conventional filters, the ADS Filter offers the following advantages:

1. Maintain solvent quality and extend solvent life span.
2. Allow for longer filter run-time and reduce the filter maintenance frequency.
3. Reduce maintenance costs - the ADS Filter can be simply cleaned and reused without replacing any consumable parts or cartridges.
4. Reduce Monoethanolamine (MEA) usage by over 50% (typical), thereby reduce the operating costs.
5. Reduce system equipment and piping corrosion due to the build-up of corrosive material, and extend their run-time.
6. Reduce Solvent Regenerator processing load, thereby reduce solvent loss and energy consumption. Lower solvent loss makes it environmentally safer and eco friendly since VOC emission during slurry removal from Solvent Regenerator is harmful to operators and the environment.
7. The two-stage separation of iron-oxide and polymer particles makes it easy to dispose the filtrates.

Figure 1 presents solvent samples taken from an existing Sulfolane Unit using conventional filter before, and the High Efficiency ADS Filter after:

**Figure 1: Sulfolane Sample After 6 months in BTX Extraction Operation**



**With Typical Filter**

**With ADS Filter**



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### **APPLICATION**

The AMT Double-Stage High Efficiency ADS Filter is most advantageous in replacing existing in-line filters of any Aromatics plants for maximum solvent life-span, minimum corrosion, minimum solvent loss and maximum run-time.

The ADS Filter is also suitable for other applications which can benefit from its double-stage filtration ability.

### **COMMERCIAL EXPERIENCES**

The High Efficiency ADS Filter has been applied in many commercial Sulfolane aromatics recovery units and proven its superiority over conventional filters in the past.

*(The ADS Filter is a patent-pending technology by CPC Taiwan, and designed, engineered, manufactured, and marketed by AMT International, Inc.)*