The control and management of sand issues is an inherent problem in the oil and gas industry whereby effective solutions have been extremely limited due to high cost or poor performance. The failure to address sand ingress in an existing completion can have a significant impact on productivity, well life, completion equipment life, and safety through the erosion of surface equipment. Notwithstanding the huge environmental and financial impact of disposing of large quantities of sand.

The conventional process of thru-tubing sand control can be costly and time-consuming, in many cases there is a requirement to remove sand from the wellbore prior to installing the chosen sand control solution. Once installed, many traditional remediation techniques still allow the wellbore to refill with formation sand, yet again reducing productivity and increasing susceptibility to erosional failure.

The major challenge is to regain sand control in existing completions and prevent sand from filling the wellbore, without the requirement to perform a costly workover or complex thru-tubing gravel packs.

The smart saviour of sand control
Tendeka, a global specialist in advanced completions, production solutions and sand control has developed Filtrex, a new cost-effective, single-trip, thru-tubing sand control solution. This has the potential to significantly improve the financial feasibility of restoring production to failed wells.

In addition to eliminating the need to perform a full workover, intervention timings can be cut in half and associated run charges reduced by at least 50%. It is the first time a technology of this kind has been able to perform sand clean-out during deployment, preventing multiple intervention trips.

The power of polymer
The key to the success of Filtrex is the use of an open-cell matrix polymer filter which can be deployed downhole where it is compressed within the running tool and compression sleeve. It can be installed in a live well, thru-tubing, and through tight nipple restrictions, whilst offering full compliance to the damaged section once set. The high compressibility of the material means the assembly can pass through tubing restrictions and expand into the larger casing/liner configurations.

When deployed on coiled tubing, installation is performed over three stages (Figure 1).

Figure 1: Sand clean-out and screen installation by Filtrex is performed across three key stages
First, as it can be deployed in a live well, this enables sand clean-out and chemical treatments to be performed as a single trip process. Upon reaching the zone of interest, integral jetting nozzles are activated to start sand clean up.

Once this is complete, a ball is dropped and pressure applied to activate the high expansion anchor deployed below the Filtrex screen.

Once set, the running tool and compression sleeve removal enables the polymer filter to expand and conform to the ID of the casing or failed screen. The filling of the annular gap prevents further ingress of reservoir solids into the wellbore whilst still allowing passage of liquids or gases.

Finally, the running tool and compression sleeve is then retrieved from the well.

The length can be modified to suit the application and lubricator length restriction. If longer lengths are required these can simply be stacked on top of the previous screen section.

**Flexibility and reliability**

The Filtrex open-cell matrix polymer encases a length of solid perforated tubing providing mechanical strength and a flow conduit from producing zones below. The multilayer system ensures full expansion in the damaged screen section or casing and effective flow divergence regaining sand control in existing completions (Figure 2).

The design of the system, derived from scrum/sprint development processes, allows the combination of many distinct layers with a range of cell sizes and co-mingled production from zones above and below the tool. This ensures the design has the flexibility to size the screen for each application and safeguard the appropriate retention of sand in standard well environments up to 110°C.

As a retrievable thru-tubing system, it is easily deployable by conventional coiled tubing through 4-1/2” completions and self-centralizes once expanded in deviations up to 90°. This initial configuration is the only product of its kind that can be run through a 3.688” nipple and set in a 7” casing/liner.

**Sand control innovation**

Filtrex is currently being evaluated against multiple applications to develop robust understanding of the system’s operating envelope and selection criteria. The company has recently invested in a dedicated sand control laboratory at its Aberdeen, UK, headquarters to support this. The facility remit is to continue developing effective and economical solutions to better manage and control a wide range of sand problems.

Filtrex technology is part of the already extensive portfolio of sand control screens the company has to offer. This includes premium metal mesh and direct wrap sand screens which have undergone rigorous testing and are fully qualified to ISO 17824 V1.

Currently, there is engagement with several operators who are developing bespoke testing programs to qualify the device for specific assets. Beyond the current design, further sizes are currently under development. Combined with other technologies and services, Tendeka can provide expanded functionality to include inflow control, cross flow prevention, water shut-off and zonal isolation.