



For over 25 years Ortloff Engineers, Ltd. has developed extensive experience successfully retrofitting NGL/LPG recovery plants to more efficient gas processing technologies. A plant retrofit offers the owner/operator one or more of the following benefits: improved ethane and propane recovery, additional gas processing throughput, and/or increased plant flexibility while operating in either ethane recovery or full ethane rejection. Ortloff's Retro-Flex Plus™ is a unique gas processing technology developed for *Retrofitting* existing Gas Subcooled Process (GSP) plants to enhance *Flexibility* - *Plus* increasing the ethane and propane recovery beyond the limitations of GSP. With only a few tie-ins and minimal downtime during installation, Retro-Flex Plus™ makes it possible to retrofit an existing GSP plant to achieve higher ethane recoveries while still retaining the flexibility of Ortloff's Retro-Flex™ process technology, including ultra-high propane recoveries regardless of ethane recovery.

## APPLICATIONS

Like Retro-Flex™, the Retro-Flex Plus™ process is capable of increasing the recoveries of propane and heavier components (C<sub>3+</sub>) from GSP plants in both ethane recovery and ethane rejection operation – without the need for additional power. However, Retro-Flex Plus™ also addresses the limitations of GSP in ethane recovery operation. With a very small amount of additional power, Retro-Flex Plus™ significantly increases the recovery of the ethane (C<sub>2</sub>) and is capable of recovering 100% of the C<sub>3+</sub>.

Invented by Ortloff in 1976, GSP is limited in recovery mainly by economics in both modes of operation. GSP plant designs typically require excessive residue compression power to achieve ethane recoveries above 92% and propane recoveries above 93%. The Retro-Flex Plus™ process was developed to overcome this limitation, improving the recovery of ethane in ethane recovery operation and C<sub>3+</sub> components in both operational modes.

As part of Ortloff's proven *Gas Plant in a Bottle*® (GPB™) product line, Retro-Flex Plus™ utilizes a

## RETRO-FLEX PLUS™

standalone heat and mass transfer device, referred to as the Cold Refluxing Module (CRM), and a small reflux compressor, both of which sit adjacent to the Demethanizer column. In ethane recovery operation, the small reflux compressor increases the pressure of a portion of the column overhead stream in order to more easily condense the stream in the CRM. The CRM condenses and then subcools the compressed overhead stream before providing additional fractionation and cooling to capture more of the unrecovered ethane which would otherwise exit the top of the GSP column.

In ethane rejection operation, the reflux compressor is taken out of service, and the retrofit design reverts back to Ortloff's Retro-Flex™ process technology.

Typical applications for the Retro-Flex Plus™ process include:

- Existing GSP plants designed for ethane recovery only which would economically benefit from higher C<sub>2</sub> and C<sub>3+</sub> recoveries in ethane recovery operation.
- Existing dual-mode GSP plant designs where economic conditions favor a more flexible design that can operate in ultra-high ethane recovery or full ethane rejection modes while maintaining ultra-high C<sub>3+</sub> recovery. The amount of ethane that can be rejected depends on existing Deethanizer and reboiler equipment sizes.
- New GSP plants that are about to be moved out of storage and placed into service. For a relatively small incremental investment, new plant owners can upgrade their "recovery-limited" GSP with the value enhancing Retro-Flex Plus™ technology.

## BENEFITS

Retro-Flex Plus™ offers the following benefits when installed as part of an existing GSP plant:

- Retro-Flex Plus™ is capable of achieving greater than 98% ethane recovery while GSP is typically limited to 85% - 92% ethane recovery.

## BENEFITS (CONT.)

- For GSP plants currently operating in ethane rejection mode, Ortloff's Retro-Flex™ process can initially be installed to improve C<sub>3</sub>+ recoveries and the capital expense required for a reflux compressor can be deferred to a later time when ethane prices make ethane recovery operation economically feasible.
- Retro-Flex Plus™ includes all of the installation and operational advantages of Retro-Flex™, but with higher ethane recovery.

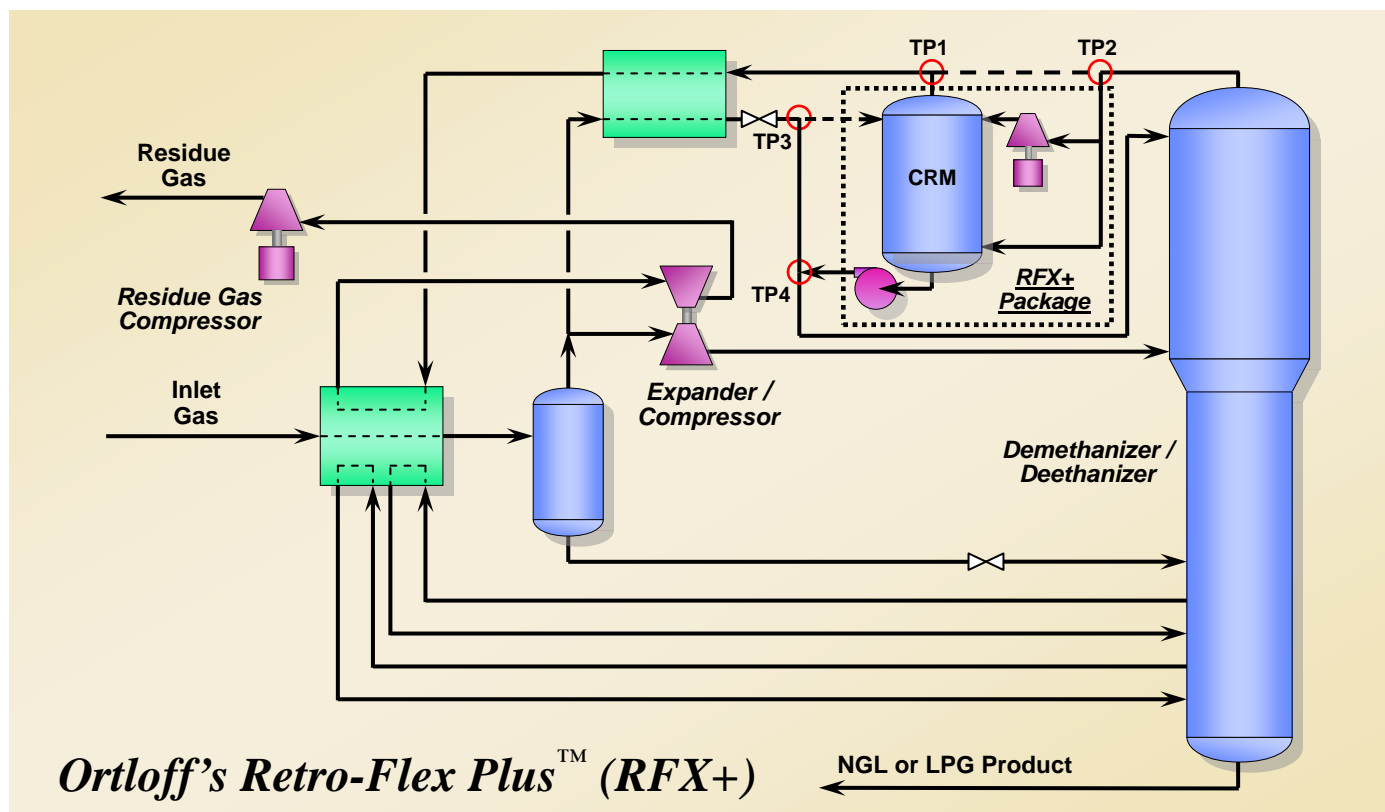
## EQUIPMENT PACKAGE

Retro-Flex Plus™ standard skid-mounted packages in sizes of 40, 80, 125, and 200 MMSCFD are under

development through a third party contractor. Custom packages are also available. Packages include the CRM, reflux compressor, pumps, instrumentation, and additional reboiling equipment, if required, for ethane rejection operation.

## EXPERIENCE

For over 40 years customers have benefitted from Ortloff's gas processing technology innovations. Retro-Flex Plus™ is one of Ortloff's newest inventions and is based on proven process and equipment design concepts. Several retrofit process designs using Retro-Flex Plus™ are currently being considered by customers who have significant experience with GSP.



## FOR MORE INFORMATION

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