



April 2009

Temporary Pipeworks Restraint System (TPR System)

Simplicity and Ease of Inspection Makes the Difference

FMC Technologies announces the introduction of the new Temporary Pipeworks Restraint System (TPR System) for use on high pressure temporary well service flow lines. Properly applied, this system will provide an additional level of protection for personnel and physical assets by minimizing the amount of sudden movement should there be an unexpected separation in a flow line while under pressure.

The FMC TPR System provides the end user a simpler and faster means of installation onto flow lines. There are only three elements to the system: Restraint Links (R-Links), Connector Links (C-Links), and Hitch Pins. The Restraint Links are used to choke on piping termination points and extend down the length of the flow line being wrapped strategically around union connections and on swivel joint elbows. The C-Links with integrated Hitch Pins are used to tie the R-Links together.

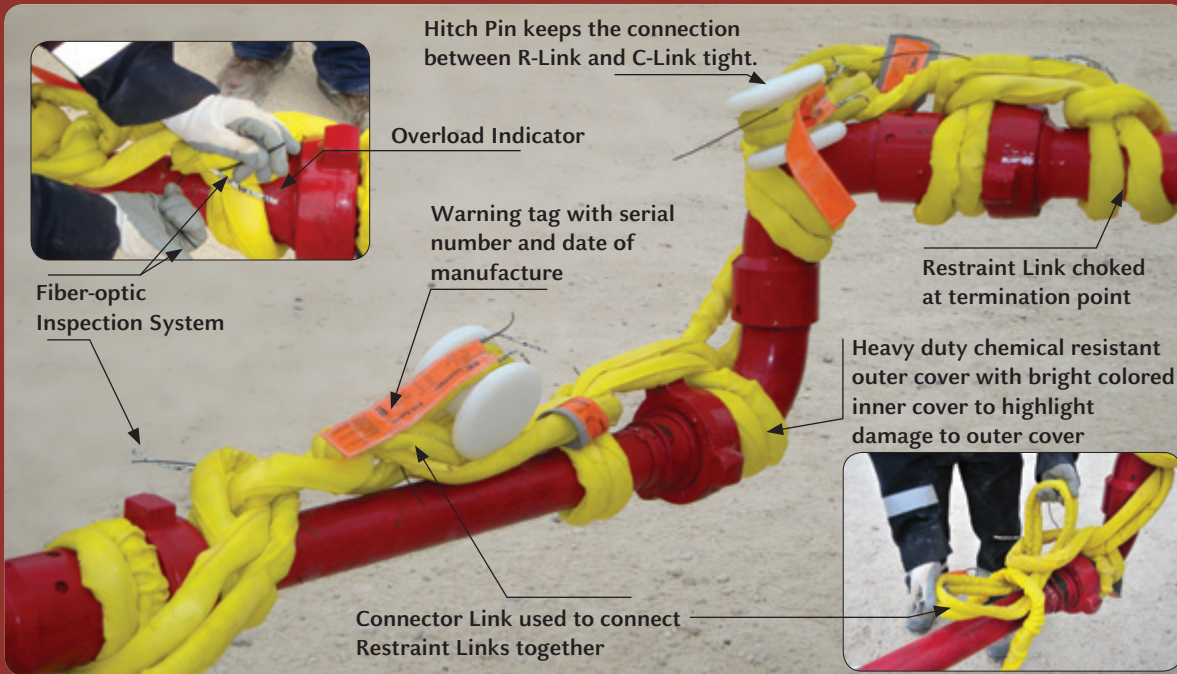
An issue with currently available restraint systems is that whenever leakage occurs at a union or swivel joint connection during pumping operations, the restraint system must be completely dismantled from one end of

the flow line to the area of leakage. The FMC TPR System can be untied anywhere along the flow line and quickly re-installed after the leaking connection is addressed.

Another issue with current restraint systems is the difficulty of the inspection. Why use a system that is hard to inspect at the site? Be confident the TPR System is ready for the job. The Links in this system are manufactured with a unique combination of inspection features. The FMC TPR System can quickly be inspected before each job.

The construction and materials used in the FMC TPR System Links are such that they outlast and have better chemical resistance than any competitive offering.

The TPR System should never be considered as a substitute for due diligence with respect to proper selection of pressure containing equipment and execution of a regular inspection and maintenance program on them. The TPR System can significantly reduce, but never eliminate, damage in cases of flow line separation under pressure.



Key Features & Benefits

- The TPR System is easy to install with only R-Links and C-Links made to the same specification
- The cover can be repaired in case of damage
- The water resistant cover make this system a perfect fit for wet or cold weather conditions.
- Patented Fiber-optic inspection for core yarn damage
- Patented over-load indicator allows instant detection of prior misuse or abuse
- Warning tag contains serialization and date of manufacture
- Inner cover with red color allows quick visual inspection of outer cover for damage
- It can be untied at any point along flow line for quick re-installation after repair of leaking connections
- This System is lighter and has higher strength to weight ratio
- More resistant to chemical attack and extreme environmental conditions
- Product and assistance available through FMC Integrated Services Team

Design Ratings

Max flow line size @ CWP:

| | | | |
|------------|-----------------|-----------------|-----------------|
| Model 100: | 2" @ 20,000 psi | 2" @ 15,000 psi | 6" @ 2000 psi |
| Model 200: | 4" @ 10,000 psi | 3" @ 15,000 psi | |
| Model 300: | 5" @ 10,000 psi | 4" @ 15,000 psi | 3" @ 20,000 psi |

R-Link Color Codes:

| | |
|------------|------------|
| Model 100: | Yellow |
| Model 200: | Green |
| Model 300: | Light Blue |

R-Link Weights (est.), Body Size (relaxed):

| | |
|------------|-------------------------|
| Model 100: | .50 lb/ft, 1-1/8" dia. |
| Model 200: | 1.10 lb/ft, 1-3/4" dia. |
| Model 300: | 1.70 lb/ft, 2-1/4" dia. |

- R-Links are offered in 5 ft., 10 ft., and 15 ft. lengths
- Temperature Range: -50°F to 180°F

FMC Technologies
500 N. Sam Houston Pkwy W.
Suite 100
Houston TX 77067
281 260 2121

Manufacturing
2825 W. Washington
Stephenville, TX 76401
800 772 8582