The High Rise bundle or High Rise (H/R) pack was originally developed to meet the needs of fire fighters when operating inside of buildings equipped with standpipe systems. In its simplest form a standpipe is a fire suppression system that provides water for use by firefighters, via permanently installed piping, on each floor of a multi-story (high rise) building. Since it would be very difficult and time consuming to lay hose lines up the stairwells of high rise buildings, fire codes were implemented that required the installation of standpipe systems in multi-story buildings.

With the supply lines already in place (in the form of standpipe system) firefighters still have to bring with them the tools necessary to extend smaller attack lines from the standpipe connection to the seat of the fire. These tools included two hundred feet of attack hose line, two nozzles and a 2 1/2"X 1 1/2" gated wye (the wye is an attachment that will divide the water coming from a larger hose into two smaller hose lines. It also incorporates two valves that provide the means to either stop or start the flow of water to the two smaller lines). These tools, combined into an easy-to-carry, easy-to-deploy bundle are what makes up the High Rise pack. The H/R bundle is configured in two separate packs (100' of hose each). The hose is folded in a simple flat load (the hose folded back and forth on top of itself in layers, each layer being 7' long). A nozzle is connected to the end of each section of hose and the wye is connected to the opposite end of one of them. Each pack is thus about 7' long and can be draped over a shoulder or over the firefighters backpack mounted air bottles in a horseshoe shape. Once the packs are delivered to the fire floor they provide quite a bit of flexibility in how they could be configured. If only a single 100' section of hose was needed to reach and control the fire, then the hose with the wye was connected to the standpipe (a 2 1/2"connection) and charged. If two hose lines were needed then the second section was connected to the wye and charged, effectively doubling the firefighting capacity. If the location of the fire was more than 100' from the standpipe connection, the two sections of hose could be connected together end-to-end to provide 200' of reach.

These H/R packs have been carried as standard equipment on virtually every fire engine in the country for decades. In that time, fire companies have found numerous other uses for this versatile grouping of tools. The problem with the traditional H/R pack has always been the method in which it is held together. Since the hose packs need to be carried in some manner to the fire floor, the folded hose needs to be held together in a compact, folded bundle that will stay neatly together until it is ready to be deployed on the fire floor. Traditionally the folded hose was held together with some form of strap in three or four places over its length. Old seatbelts, large rubber bands made from inner tubes, or even tightly cinched parachute cord have been used to hold the bundle together. None of these methods is well designed to meet all the needs of firefighters trying to assemble and deploy a H/R pack in the often dark and hostile environment that may be encountered in a structure fire. Oftentimes these same makeshift methods caused the pack to hang-up when trying to remove it from apparatus compartments or loosen and allow the bundle to fall apart prior to reaching the location of the fire. A highrise pack should meet the following criteria

1. Hold the folded hose securely yet remain flexible on the long axis so that it may be easily horseshoed over the shoulder.
2. Fit easily into compartments already in place on fire apparatus and designed for the purpose. It should also easily deploy *out* of these same compartments.
3. Be lightweight so as not to add to the already heavy weight of the gear that the firefighter must carry.
4. Deploy easily and effectively with a gloved hand.
5. Be durably constructed out of materials that will stand up to heavy use on both the fire ground and in the training arena.

Our newly designed H/R pack meets all of the stated criteria. It is constructed with a flat base that sits under the folds of the hose and acts as the foundation for the buckled straps that hold the hose in place. The base is constructed with a core of flexible plastic stiffener material that is wrapped with durable ballistic nylon material and heavily sewn to provide a firm base to which buckle straps are attached. The construction of the base provides adequate flexibility along its length but little or no flexibility from side-to-side. The base also serves as a sort of low friction "runner" that aids in easily sliding the pack out of fire apparatus compartments. The straps are made from 2" poly webbing and employ nylon, side-release, single adjust buckles. These buckles allow the straps to be tightened down securely yet be quickly and easily opened with a gloved hand. The straps also have sewn-in aluminum stiffeners on the sides that provide solid vertical structure to the pack and keep the hose secure even if the straps are under tightened. Another innovation in the straps is the rollers installed where the strap contacts the top of the folded hose. These rollers were employed to counteract a problem that has plagued nearly every other pack design. Simply put, it is easy to fold hose into a nice, neat bundle and strap it tightly together when it lying flat and straight. However, the problem arises when you attempt to then bend that bundle into a horseshoe shape. To achieve the horseshoe shape the individual layers of hose must be able to slide against each other since the arc of the inner layer is much tighter (smaller) than the arc of the outer layer. A tightly strapped bundle can be picked up from the middle and the hose will remain nearly straight, like a 7' board. A long straight hose bundle, carried over the shoulder, is a difficult object to carry up flights of stairs. Using old style methods of securing the bundle, firefighters resorted to keeping the straps loose, inevitably causing the bundle to fall apart enroute to the fire. In our new design we securely tighten the two forward straps, firmly securing the hose, nozzle and wye. But we allow the two rear straps, with top rollers installed to remain slightly loose. This configuration allows the folds of hose over half of the pack to freely slide and easily achieve the horseshoe shape. The side stiffeners of the straps, even when loose, keep the hose neatly, vertically stacked no matter the jostling or abuse it may be subjected to. Another innovation of the pack is the side wings that are incorporated into the front strap. When bundled correctly, the wye and the nozzle are placed at the very front of the pack. Each of these pieces are rather heavy and incorporate plastic and rubber handles. These protrusions (valve handles) and high friction components (rubber nozzle handles and bales) have traditionally been the most common items that will cause the old style packs to hang-up when being removed from the apparatus or when being carried through tight quarters to the fire. The side

wings, made of sewn ballistic nylon fabric with internal plastic stiffeners, are attached to the forward-most strap and effectively sandwich both the nozzle and the wye into a protective sleeve at the front of the pack. The final feature of the units are the two handles. The first is sewn securely to the front of the pack and is large enough to be easily grasped by a gloved hand. It is designed to aid in removing the pack from the apparatus, as well as to allow the pack to be dragged when firefighters need to move about on hand and knees. It also provides a solid purchase point to secure the packs in open compartments if needed. The second handle is sewn onto the rear of the pack and is much smaller. It is primarily designed to aid in loading the pack into compartments. As the pack is loaded into the compartment, the rear handle can be grasped with three fingers or a tool (like a pike pole) and guided into the correct location while sliding the rest of the unit into place. This small handle is very compact and is unlikely to catch on anything when the pack is being removed from the apparatus or while the pack is being dragged on the fire ground.

The packs will be available in several designs to meet the various needs of different fire departments. The 7' model, designed for engines with longitudinal compartments (hose bed), will be available in sizes to accommodate 1 1/2", 1 3/4" or 2" hose. A 6' model is also available for engines that utilize transverse (side-to-side) compartments and designed to fit the same three hose sizes.