

# FREQUENTLY ASKED QUESTIONS

## OTR NDX™ SYSTEM



**What is NDX and what does NDX mean?**



NDX is the name for OTR's all-new airless tire and wheel system that will replace stock vehicle/machine tires and wheels in the aftermarket and provide an innovative mobility solution for OEMs. "NDX" is the reference to the formerly named "NEVER DOWN" line. We call it a "system" because the tire and wheel are sold as an integrated assembly (not separately).

**What does it do?**



NDX's innovative design and unique construction effectively neutralizes the long-standing problem with flat tires for commercial turf equipment and utility vehicles operating on rough turf and off-road, at worksites. It performs especially well when subjected to extreme conditions, even when tires are damaged. This means there is NO downtime and NO loss of productivity and utilization. It also provides a safety net for operators, as there is no risk from a tire blow-out.

**How does it work if there is no air?**



OTR Engineering has developed a unique design using proprietary materials and construction techniques that enable the tire to support itself—no air required—even under extreme loads. Moreover, the NDX system leverages OEM-approved tread patterns, with lugs and shoulders designed to minimize wear, as well as wide contact patches that optimize stability and traction. A normal pneumatic tire must have air to function and support weight but it is difficult to maintain correct air pressures.

**Is there any reason to put air in the NDX? If so, how much?**



It is possible to put air in the NDX, but not necessary. In fact, even though it's an airless tire, adding air will increase load capacity. We don't promote this because, after all, it's an "airless" tire and research suggests operators would rather not have to worry about it. If added, we recommended a maximum of 20 psi.

**Is there a payback, given the fact NDX costs more than a stock pneumatic tire?**



While the initial purchase price is higher than a conventional tire, the payback can be fast. For example, we know a major U.S. railroad operates a fleet of RTVs subjected to ultra-harsh conditions where on average, they experience a flat tire every other week. Using this as an example, there could be a payback in less than 3 months!

**Is it hard to install, and what about service?**



NDX units are sold as assemblies that are easy to install. The assemblies are compatible with popular bolt patterns, as form-fit-function replacements for OEM stock tires and wheels. There is NO service required, because in the event the tire wears out (as will happen with any tire over time), and/or it's severely damaged, the user will simply replace the whole assembly. In this way, it is possible to maintain the design integrity of the system and ensure the correct interface and performance for intended applications.

**Is the NDX heavier than my stock tire and wheel set-up? If so, how much heavier?**



Yes, it's heavier because our focus was on providing a user experience better than or equal to a conventional pneumatic tire without compromising performance or function, with the goal to eliminate concerns with flat tires. The weight increase is approximately 25% compared to a pneumatic tire in the same size.

**Will extra weight damage my vehicle's suspension? Will it make the ride harsh and uncomfortable?**



No, utility and rough terrain vehicles, as well as commercial mowers, are designed with heavy duty suspensions and axles with a cushion for loads beyond rated capacities. The applications we've targeted are designed for worksites, where vehicles tend to operate a lower speeds. The NDX system distributes weight evenly from side to side and front to back. In fact, unlike a pneumatic tire, NDX retains its original profile with no air required under heavy loads, with much less deflection. This results in performance that is comparable if not better than a pneumatic tire, in terms of stability and ride comfort.

**I am using another airless tire brand. How is yours different and is it better?**



There are numerous airless tire options, including one with no sidewall, but the technologies are different. NDX's patent-pending design combines multi-layered fabric construction, engineered structural supports and unique tread belt that maintains desired curvature at all times. Tread construction leverages premium rubber compounds and proprietary chemistry with a deflection management system, optimizing energy absorption and load distribution for a ride as good if not better than pneumatics. This also contributes to less jarring and bounce to reduce operator fatigue.

**Who is using your product and how is it working?**



Several well-known OEM customers are field-testing it now and we just secured a program with a national railroad who use RTVs. The feedback we've gotten so far is that the tires are performing "better than expected" in ultra-rough environments, where operators are experiencing flats with conventional tires literally every other week.

**What about tread wear?**



Tread wear on the NDX is comparable to airless and regular pneumatic tires. NDX is a heavy-duty tire with a 14-ply effective rating, so it's designed to last as long as possible, operating in severe-duty applications. However, our design focus was on structural integrity and flat prevention. If the end user is NOT having any issues with flat tires, the NDX can still provide benefits.

**In my application we really don't have many flat tires. Is the NDX still worth using?**



It depends on what the end user is hoping to accomplish. NDX is designed for severe-duty use, where flat tires are a recurring problem for customers whose livelihoods depend on 100% uptime. If this is not an issue, there are other benefits in using the NDX to consider, such as 1) peace of mind from having to worry about a flat; 2) elimination of maintenance to ensure the tire is properly inflated; 3) better fuel economy compared to stock OEM tires (which are often times commodity tires where the emphasis is more on low price, not high function); and 4) improved braking performance resulting from the tire's spring rate that helps maintain its original profile, with minimal deflection, thus enhancing braking power.

**Why did you integrate the wheel into the tire? Can I get a different wheel?**



We designed NDX as a "system" for easy installation for the initial launch (our phase 1). There is no need to worry about wheels and associated complexity; we've done the work to set it up. We will add more wheel options in the future, including basic steel wheels for OEMs and end users who prefer this type of wheel.

**Can I buy NDX units now?**



Yes, we have limited quantities available for testing and initial stocks. We are also taking preorders from several customers so we can plan and schedule builds, and support spring launches.

**What happens in the summer when your tire gets really hot? Does this affect performance?**



Obviously, higher temperatures cause air to expand in pneumatic tires and this contributes to premature wear and possible failure when tires continue to operate when overinflated. There is no such problem with the NDX and even if there is a small amount of air pressure in the tire it's well below the threshold for causing any issues.

**How about in the winter? Does anything change?**



Pneumatic tires obviously lose air pressure during cold weather resulting in the tire being underinflated which can also lead to premature wear and/or tire failure, especially if used at a worksite where the vehicle carries heavy loads. NDX is not affected by this condition; its design mitigates the effects of cold weather and even if there was air in the tire, it doesn't matter if the air dissipates because NDX is an airless tire.

**How many different NDX units do you have now and can you customize applications?**



We are up to 55 assemblies that support a wide range of utility vehicles and turf equipment. This is covered in the fitment guides we've prepared to help customers specify the right NDX systems. We are willing to customize units for OEMs, depending on the volume and level of customization required. This complements what the OEM will do to tune their suspensions and make adjustments for GVWR as required for severe-duty applications.

**Can the NDX work in other applications, not just utility vehicles and turf equipment?**



Yes, literally any OTR tire used in rough off-the-road applications could be candidates for an NDX system. We are focusing for now on turf and utility applications because these are huge markets where flat tires are a significant pain point. Markets that are heavily focused on machine productivity and utilization are a good starting point.

**What is the maximum load and maximum speed for the Grass Master / 350 MAG?**



Reference NDX data sheets. Note that "maximum" is a recommendation for maximum load and speed provided as a guideline for optimal use.