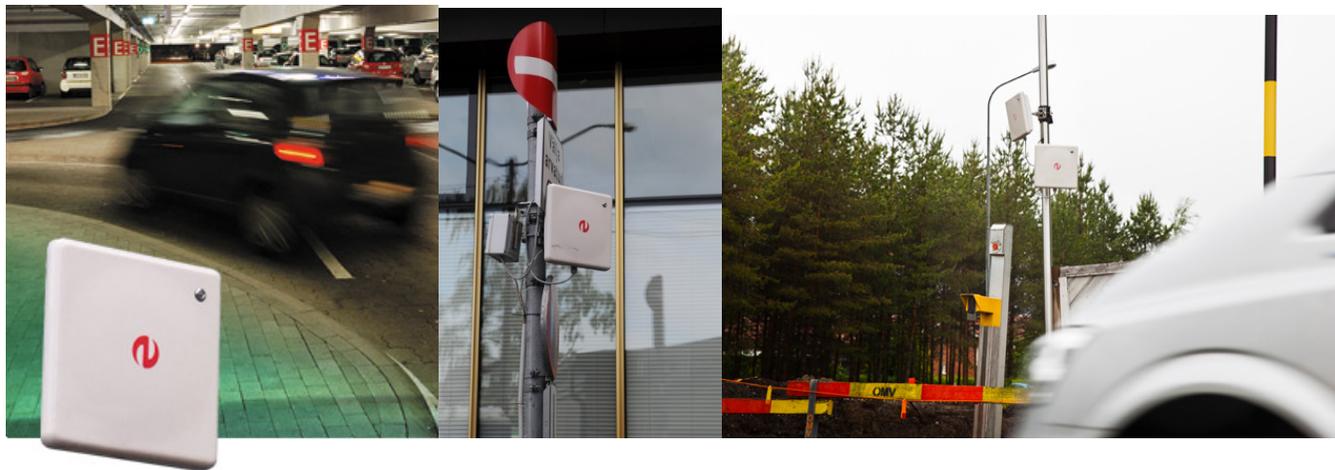


# Idesco EPC

AVI application



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# Reader and Transponder Factors

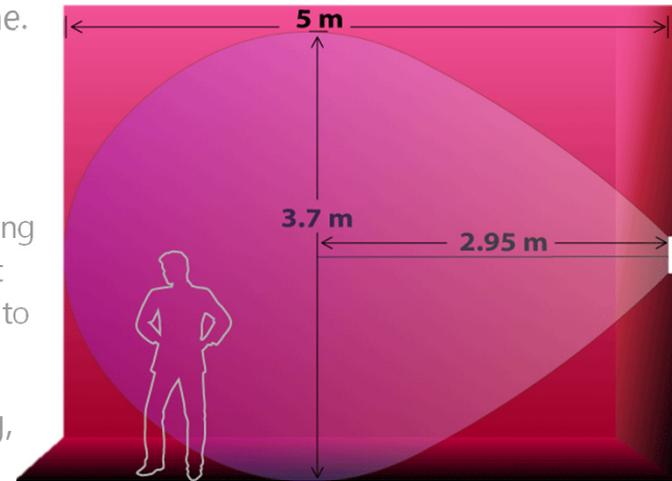
- A yellow LED will flash to report a successful reading event. This function can be helpful during initial testing after installation.
- **Note:** windshield tags function properly *only* when installed on glass or plastic surfaces
  - Handheld or cardboard-mounted tags only reply reliably during testing at distances up to ~1,5 meters
  - Only hold tags by their edges – holding the tag in its middle may disturb the antenna operation.
- **Note:** numerous radio-reflective surfaces can heavily impact performance. Allow for extended testing to identify optimal reader site in such reflective environments.
- **Note:** Reflections may also distort or skew the reliable reading area
  - Reflections can have positive or negative effects on the shape of a reading zone and its distance
  - Metal surfaces give the strongest reflection, but other materials can also cause them.



# Emission Patterns

## Readers and Transponders

- EPC reader emits radio waves outward in the shape of a cone.
  - The beam cone expands outward, vertically and horizontally, at an angle of 65° off of the plane of the reader.
- The reader's antenna only transmits effectively forward.
  - Backward and side scatter emission is so weak that reliable reading at those angles is less than 1 meter. Environmental reflections at a site might sometimes give better results but they are *only* due to those reflections and not the emission pattern of the reader.
- Transactions occur when this pattern overlaps with the tag, providing the chip enough power to reply to the reader.
- EPC Windshield Labels reply with emissions in 360 degrees around their axes; amplitude is strongest perpendicular to the tag axis.
  - At angles approaching parallel to the tag's axis, the strength of the reply gets weaker, until the tag doesn't emit at all in directions parallel to its axis.
  - Because of these patterns, a reader installed above a lane reads horizontally-installed tags more reliably than if it's installed on the side of the lane.
- The pattern of 3D Frog Labels is omnidirectional (360 degrees to every direction), so tag position doesn't impact its reading reliability.



# Installation of EPC Reader

- Your reader will be delivered with an installation set for deployment on wall, ceiling or poles.
- Installation can be made on poles with diameters between 25,5 and 44,5 mm.
- The best deployment location always depends, of course, on the site environment.
- Generally, the best reader location is above a vehicle lane, but not too high. When installing above a lane, place tags horizontally on windshields, opposite the rearview mirror.
- When AVI tags are deployed elsewhere on a windshield, they will still require at least 20 mm. buffer distance between tag edge and any other metal surface of the automobile.
- If it's impossible to install your reader above the vehicle lane, it must be installed to the side of it.



# Installation of EPC Reader

- When your readers is installed on the side of a lane, transponder must be placed on the side of the windshield closest to the reader, either upper or lower corners.
- To minimize the horizontal distance between your reader and vehicle tags as much as possible, install the reader as close as possible to the lane's edge. This is particularly important for sites with EPC Windshield Labels in horizontal positions (see Emission Patterns, above).
- You can attempt installing Idesco EPC Windshield Labels vertically, if an acceptable reading distance or reliability is not achieved with the label in horizontal position.
- When the EPC Windshield Label is vertical, windshield declination must be considered during installation. Consider siting your reader slightly above the tag, since the amplitude of a tag's reply will be most powerful perpendicular to its own axis.
- Note, however, that in vertical positions, EPC Windshield Labels will also radiate strongly sideways, to be potentially detected by a reader in an adjacent lane. Correspondingly, strong sideway replying tags (e.g. 3D Frog Tag) are *not recommended* for sites with adjacent lanes.



# Installation of EPC Reader

- After installing your reader, experiment to determine the reliable reading area using a tag installed on the surface of a glass or plastic plate. This will help you identify and reflection or 'dark' zones.
- If you don't achieve your preferred read distance or zone initially, experiment by changing the angle or the location of your reader.
- Remember: your reader will flash yellow after a successful reading event, which will help you identify your reader's reliable reading zone.
- When testing, always hold your tag in a position and orientation representative of where it will be installed on a vehicle.
- In this way, you can simulate the vehicle driving through the gate by walking with your test tag into the reading zone.
- Once a preferred reading distance and zone is achieved this way, test reader operation once more with a tag installed on a vehicle.



# Special Windshields

- Note that some vehicle windshields have metal coatings. These can substantially reduce reliable reading distance or even hinder reading.
- Frequently, however, a metal-free area can be found in the windshield, either directly behind the rear-view mirror or at one of the corners.
- For example, while Ford Mondeo windshields contain heating elements, a suitable tag location can be found in both of the windshield 's lower corners.
- Note: some Audi A8 and Lexus car models come with windshield metal coatings to reflect UV radiation. Unfortunately, this coating could reduce the reliable read distance of installed tags.
- If the reliable read distance of a windshield tag is unsatisfactory, Idesco can provide its EPC Metal Tag ABS for siting inside the vehicle (e.g. on the dash) or installed onto the vehicle bumper which will probably resolve the issue.



# Long Distance Read Error

- Too great an identification zone can also cause problems for your site. Sometimes a reader can transact with a tagged vehicle driving through an adjacent lane or down a nearby street.
- To prevent this, try horizontal siting of the EPC Windshield Label. (see Emission Patterns, above)
- In some instances, metal surfaces near the reader are skewing the reading area, causing the error.
- Hanging your reader from above and aiming it straight downward can reduce such reflections while also shortening the reading distance. This may also help protect your reader from erroneously interrogating transponders outside of your preferred identification zone.
- If the problem can't be resolved by changing tag orientation or reader direction it is possible to reduce the transmitting power of your reader.



# Examples of Reader and Tag Siting

Whenever possible, the most ideal position for an AVI reader is above the vehicle lane. This gives the reader the most optimal position for transacting with the tag. Correspondingly, tags should be installed opposite the rear-view mirror, in the middle of the vehicle's windshield.



# Examples of Reader and Tag Siting

If your reader can't be installed above the vehicle lane, deploy it to the side of the lane. In this case, install your reader as close as possible to the vehicle lane, with the transponder preferably sited on that part of the windshield which approaches closest to your reader. If corner siting of the tag isn't feasible, try siting it close to the rear-view mirror – but only if a reliable reading distance has already been prove by your own testing.

