



Flyer 4005

## 2D Data Matrix Bar Code ID for Pipe



Typical redundant 2D Data Matrix bar codes on pipe—each approx. 1.25" (32mm)

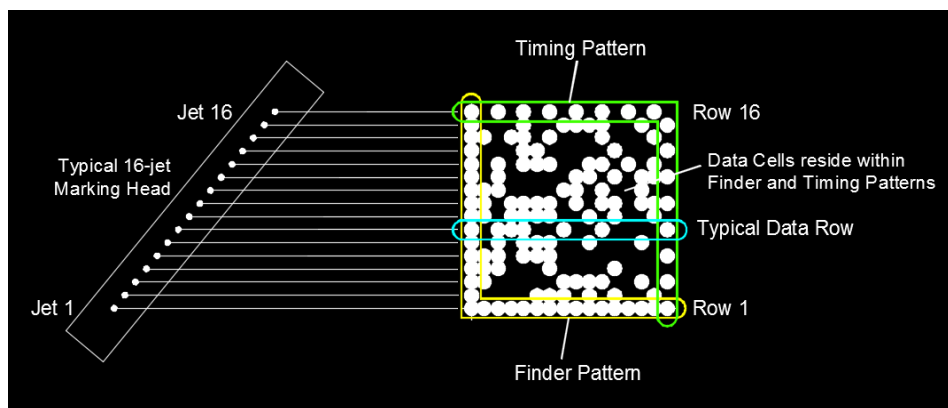
Many pipe manufacturers specify 2D bar code identification for their pipes or bars. InfoSight offers 2D Data Matrix bar code identification solutions, within certain limitations.

The proper identification solution for a given application depends on many factors, including ease of readability, survivability, size and type of data to be encoded into the bar code, and whether the bar code is intended for in-plant tracking only, or for post-shipment tracking.

The primary advantage of 2D codes is that they offer bar code identification that can include numbers, alphabetic characters and punctuation (any ASCII character), in a relatively small space. A 16x16 2D code can encode up to 24 numbers, or 16 alphanumeric characters.

The primary disadvantage of 2D codes is that they are relatively fragile in terms of survivability. They have to be marked with near perfection, and a very small amount of damage can render them unreadable. Malfunctioning ink jets or bouncing pipes during the marking process can result in no-reads.

Note that if your existing 2D marking solution is not working out for you, InfoSight can offer alternate automatic identification solutions that are ideally suited for pipe identification.



**Terminology used for a typical 16-dot high 2D bar code**  
**Note that this code is typically marked in a linear fashion using a multi-jet printhead**  
**Loss or distortion of as few as one (1) row of dots can render this code unreadable**

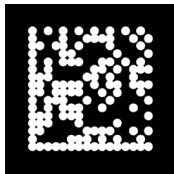
#### **ADVANTAGES of 2D codes:**

1. A 2D code can encode a large number of alphanumeric characters in a small space.
2. 2D codes are readable by commercially-available fixed-mount and handheld readers

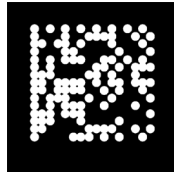
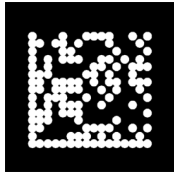
#### **DISADVANTAGES of 2D codes:**

1. 2D codes become unreadable when applied with a malfunctioning printhead (remember that 2D codes are marked linearly by multi-jet marking heads)
2. 2D codes become unreadable with a very small amount of damage / missing dots
3. 2D codes become unreadable with a very small of distortion (for example—pipe bouncing or rocking during marking).

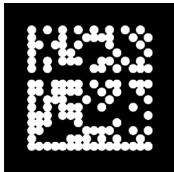
#### **Some 2D code examples follow — shown for a 16x16 2D code:**



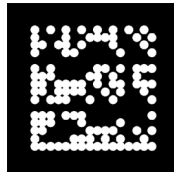
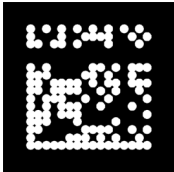
“Perfect” dot-matrix 2D code — encoding data “2D DATAMATRIX”



Jet 1 (bottom Finder Pattern) or Jet 16 (top Timing Pattern) malfunction — this code is unreadable



ANY one (1) Data Row — jet 2 thru 15 (any single jet) malfunction— this code is readable



ANY two (2) Data Rows — jets 2 thru 15 (any two or more jets) malfunction— this code is unreadable

#### **Recommendations**

- Upfront mill testing is recommended for any automatic bar code identification installation
- Marking should be performed at slow speed with NO bouncing, rocking, or other pipe motion
- Marking of multiple redundant 2D codes is recommended on each pipe to increase the probability of a good read downstream
- It may be necessary to adjust mill process geometry to limit bar code exposure to damage by downstream mill processes (for example, move rollers and skids away from the bar code)
- Multiple redundant bar code readers may be necessary at each reading location
- Adequate non-glare illumination is required at bar code reading stations
- The bar code should be located at a known offset from the leading (indexed) end of pipe at all reading stations, to limit the “bar code reading window” to a manageable size
- The bar code must be “visible” to the bar code reading system to be read. Pipe should be end-indexed within tolerance at all reading stations. Pipe spinning / rolling can be used, or multi-scanner installations can be utilized to capture the bar code when radial position is not known.