MAOP

Pressures

MAOP

MOP

OP

MAOP

"Maximum Allowable Operating Pressure" means the maximum pressure at which a pipeline or segment of a pipeline may be operated under this part.

§192.3

MOP

"Maximum Actual Operating Pressure" means the maximum pressure that occurs during normal operations over a period of one year.

§192.3

OP

- "Operating Pressure" means the pressure on the pipeline at any given time.
- Usually the setpoint of the Regulator

Class Location Definition
§192.5

The *class location unit* is an onshore area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline.

The class location is determined by the buildings in the *class location unit*. For the purposes of this section, each separate dwelling unit in a multiple dwelling building is counted as a separate building intended for human occupancy.

Class Location Unit

- A *Class 1* = 10 or less buildings intended for human occupancy or an offshore area.

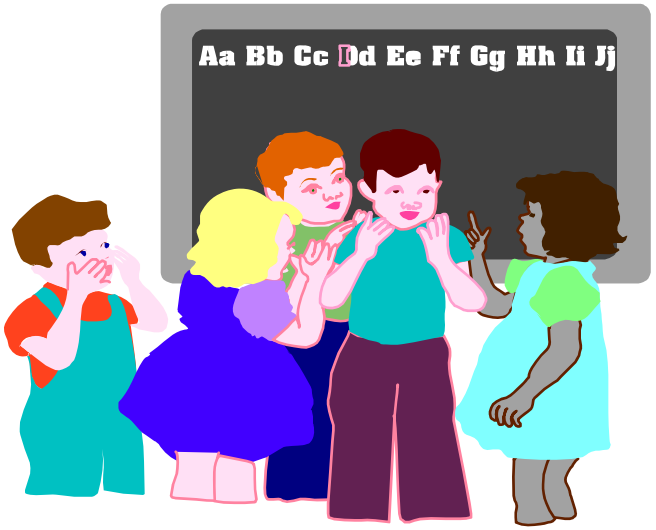
- A *Class 2* = Greater that 10 but less than 46 buildings intended for human occupancy.

- A *Class 3* = 46 or more buildings intended for human occupancy; or

Class Location Unit

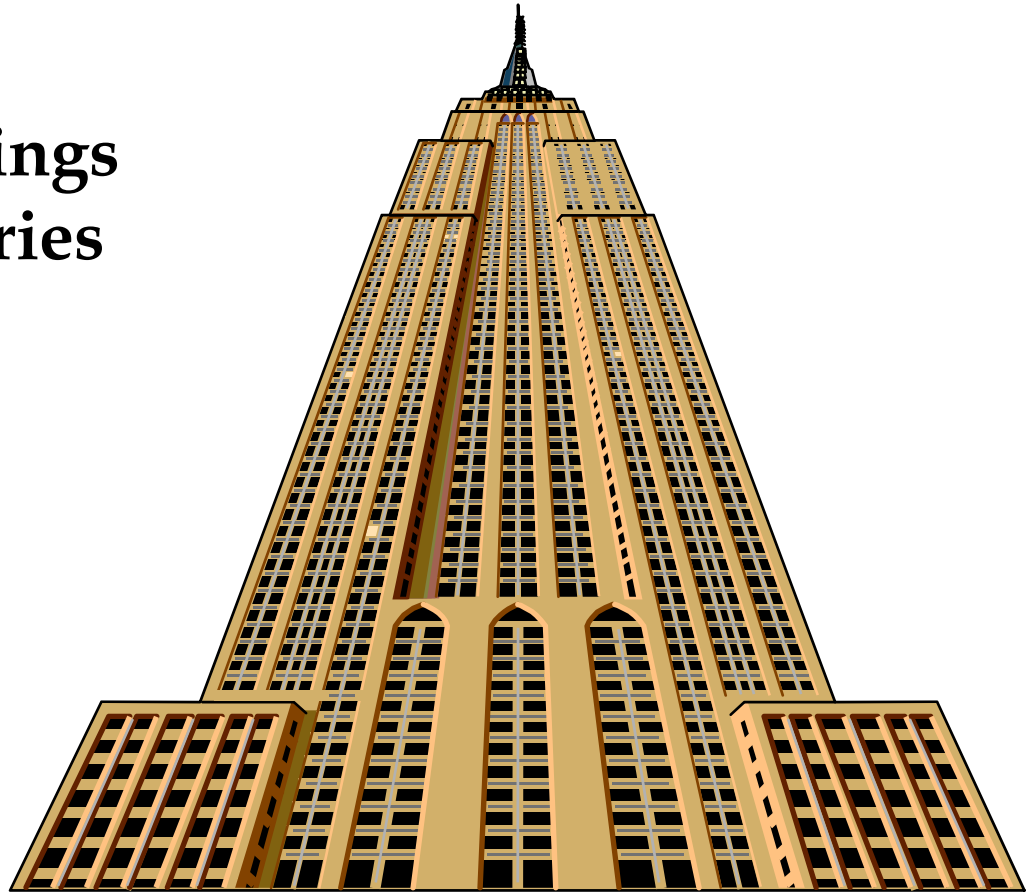
Class 3 - where the pipeline lies within 100 yards of either a building or a small,

- Well-defined Outside Area
  - Playground
  - Recreation Area
  - Outdoor Theater
- Occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period

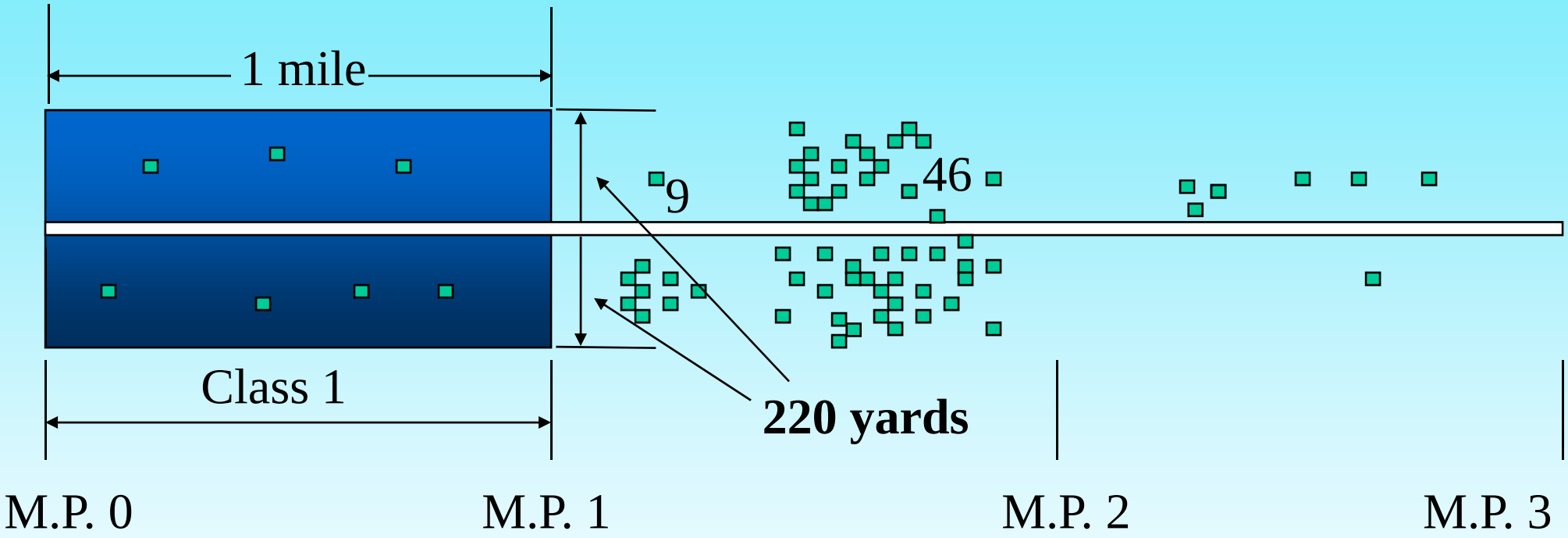


Class Location Unit

Class 4 - where buildings with four or more stories aboveground are prevalent.

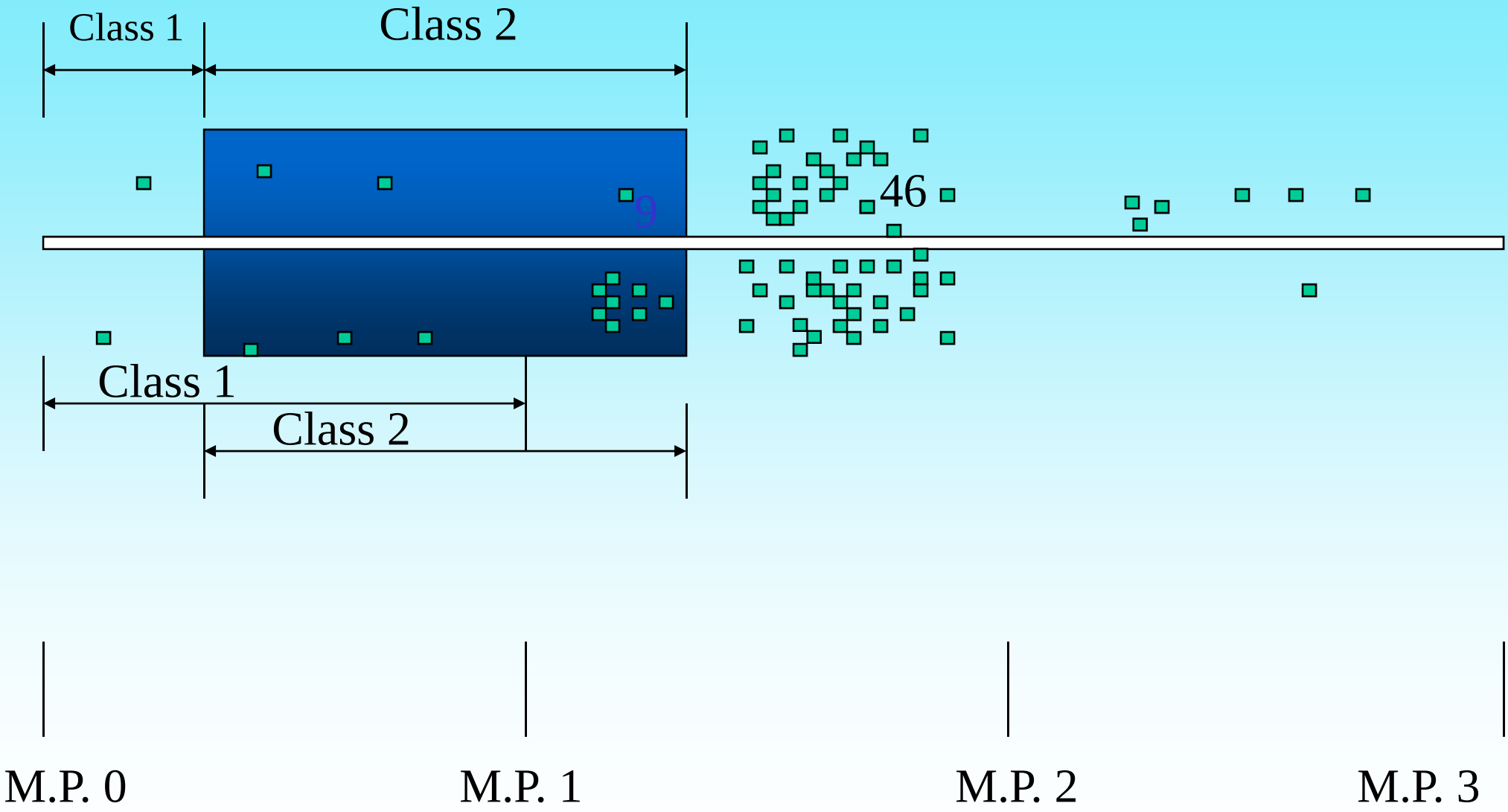


Class Location Determination

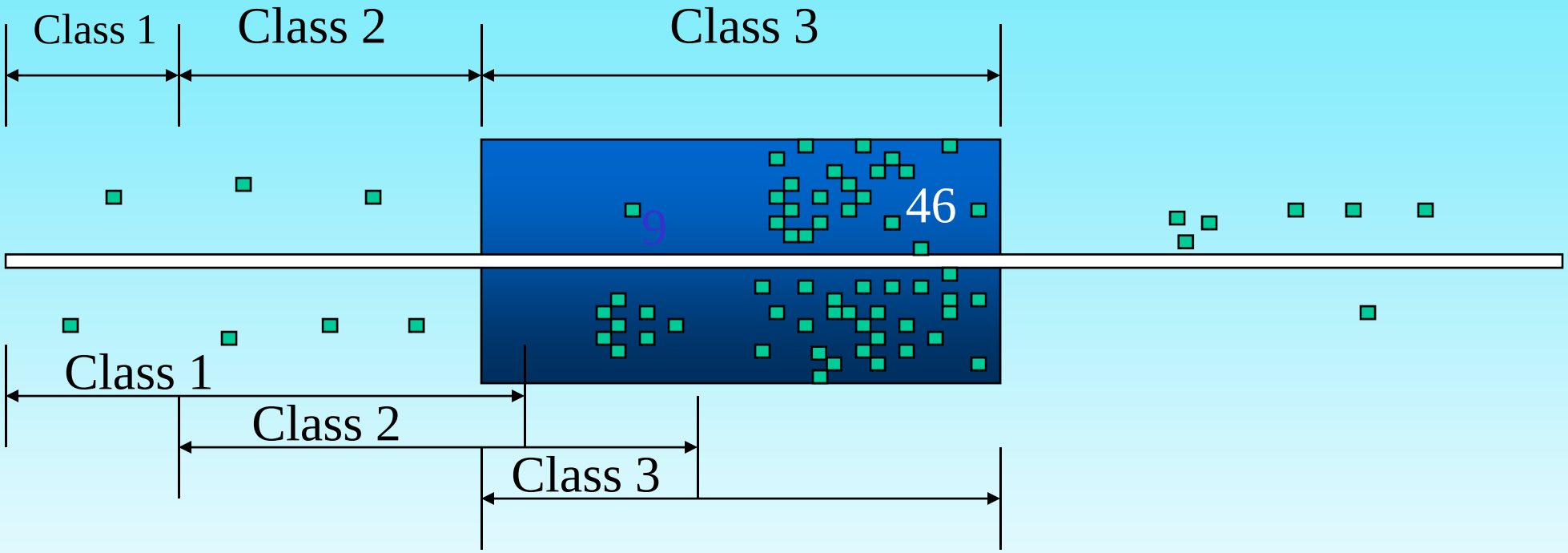


M.P. = Mile Post

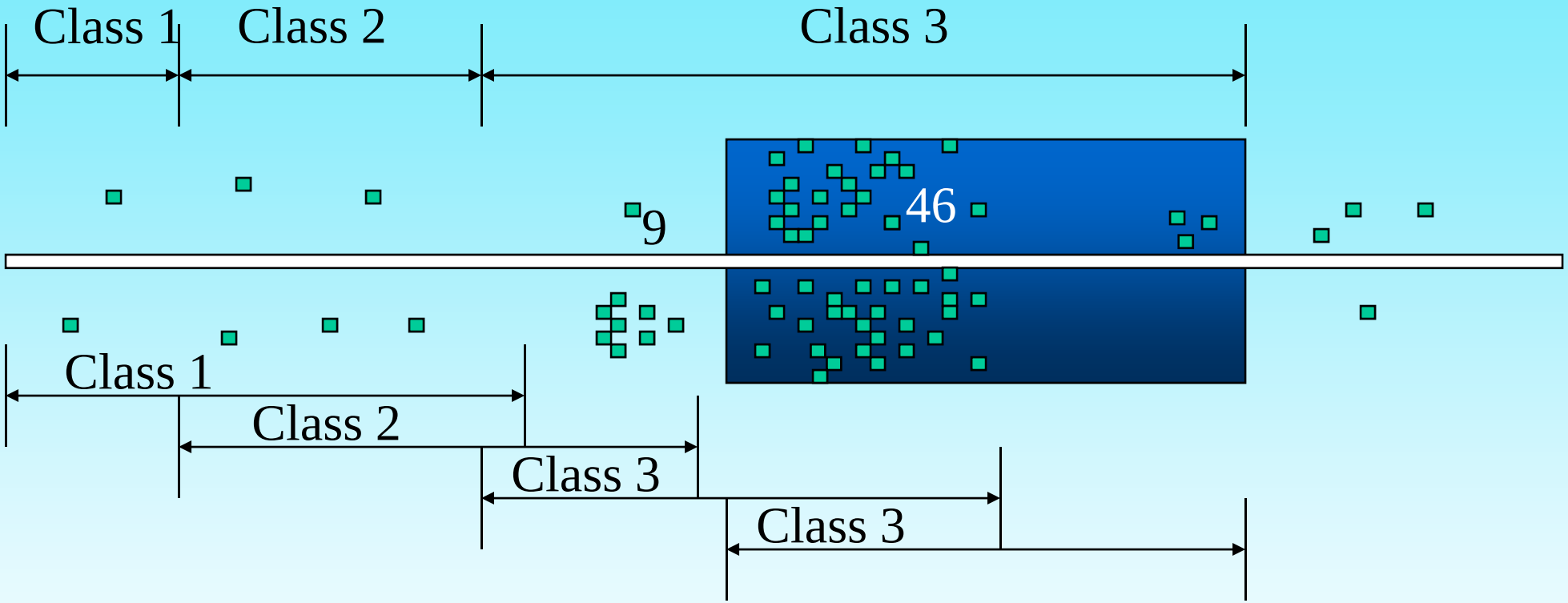
Continuous Sliding Mile



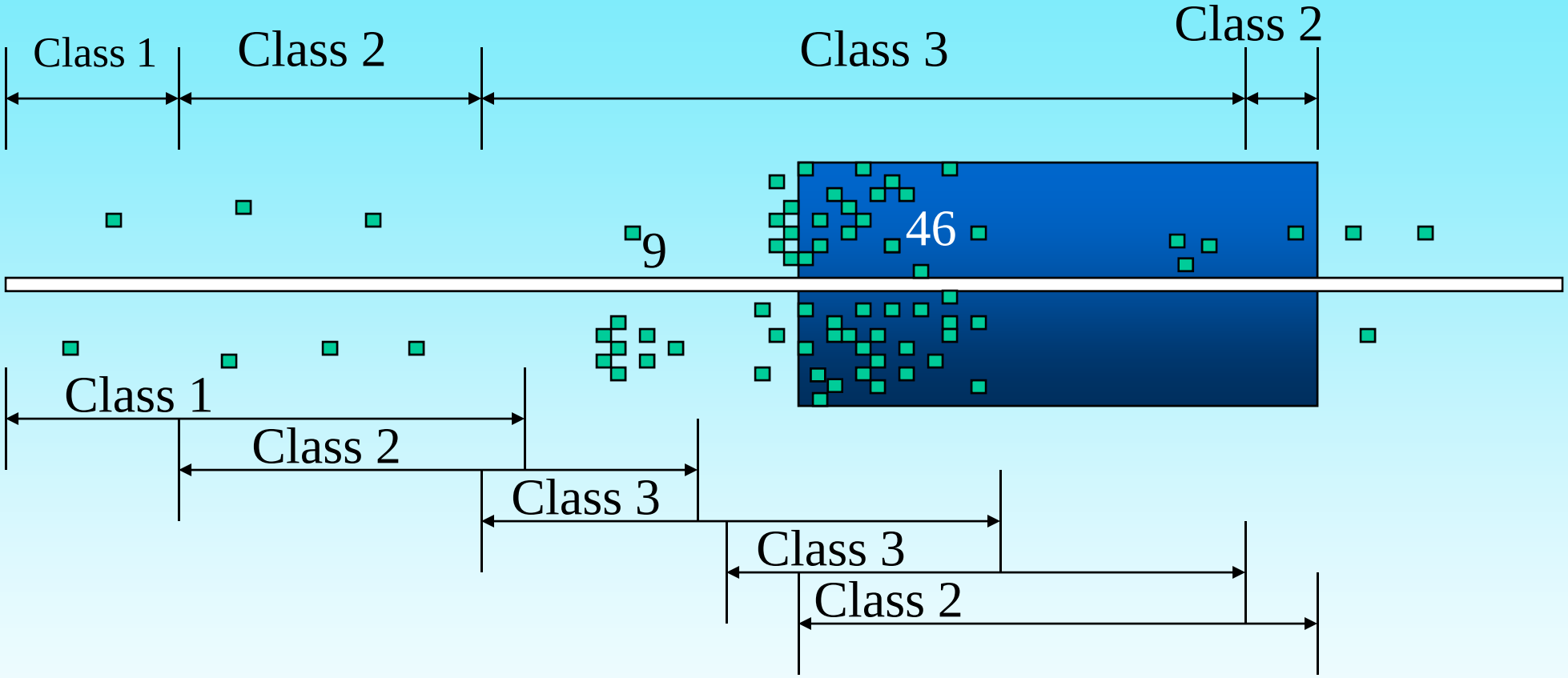
Continuous Sliding Mile



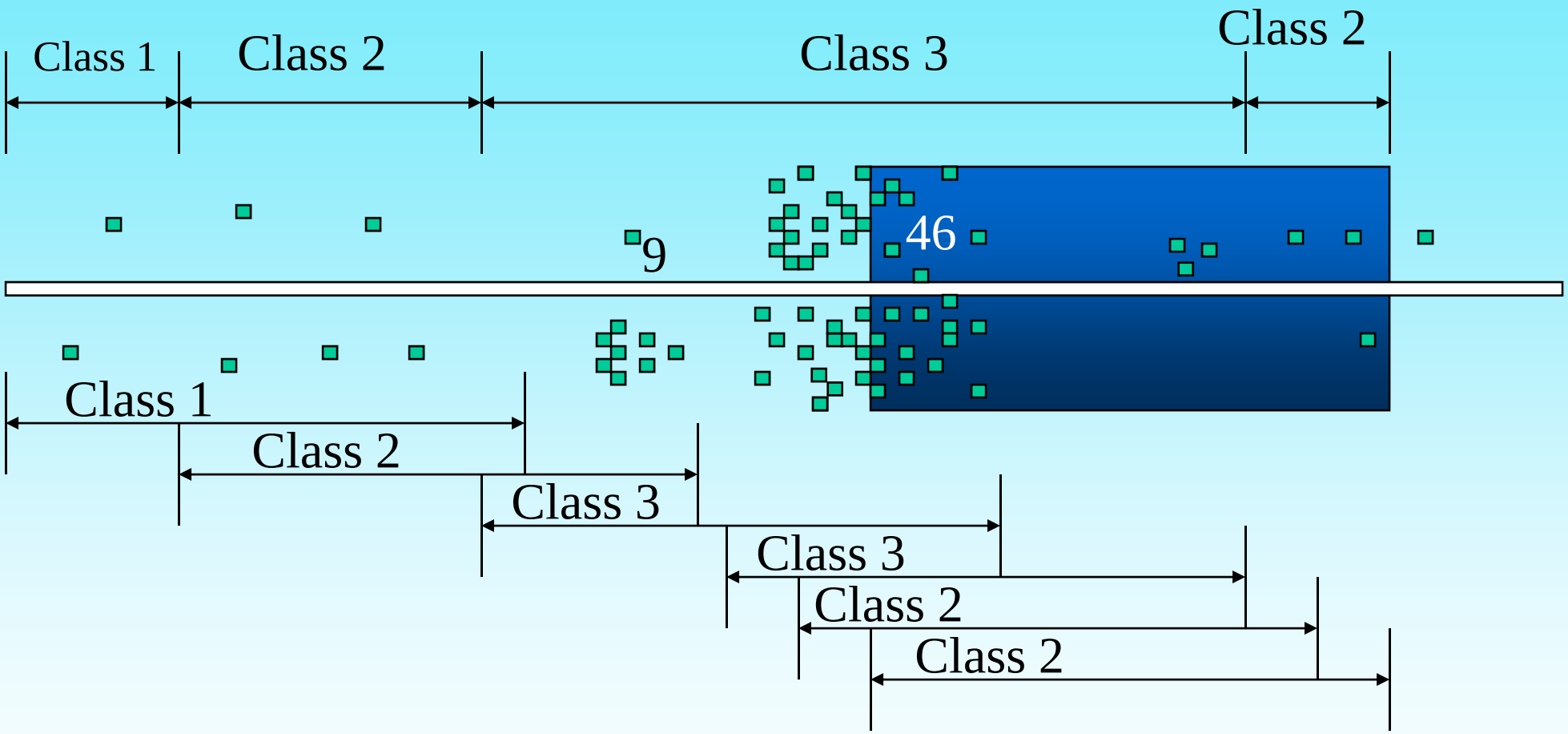
Continuous Sliding Mile



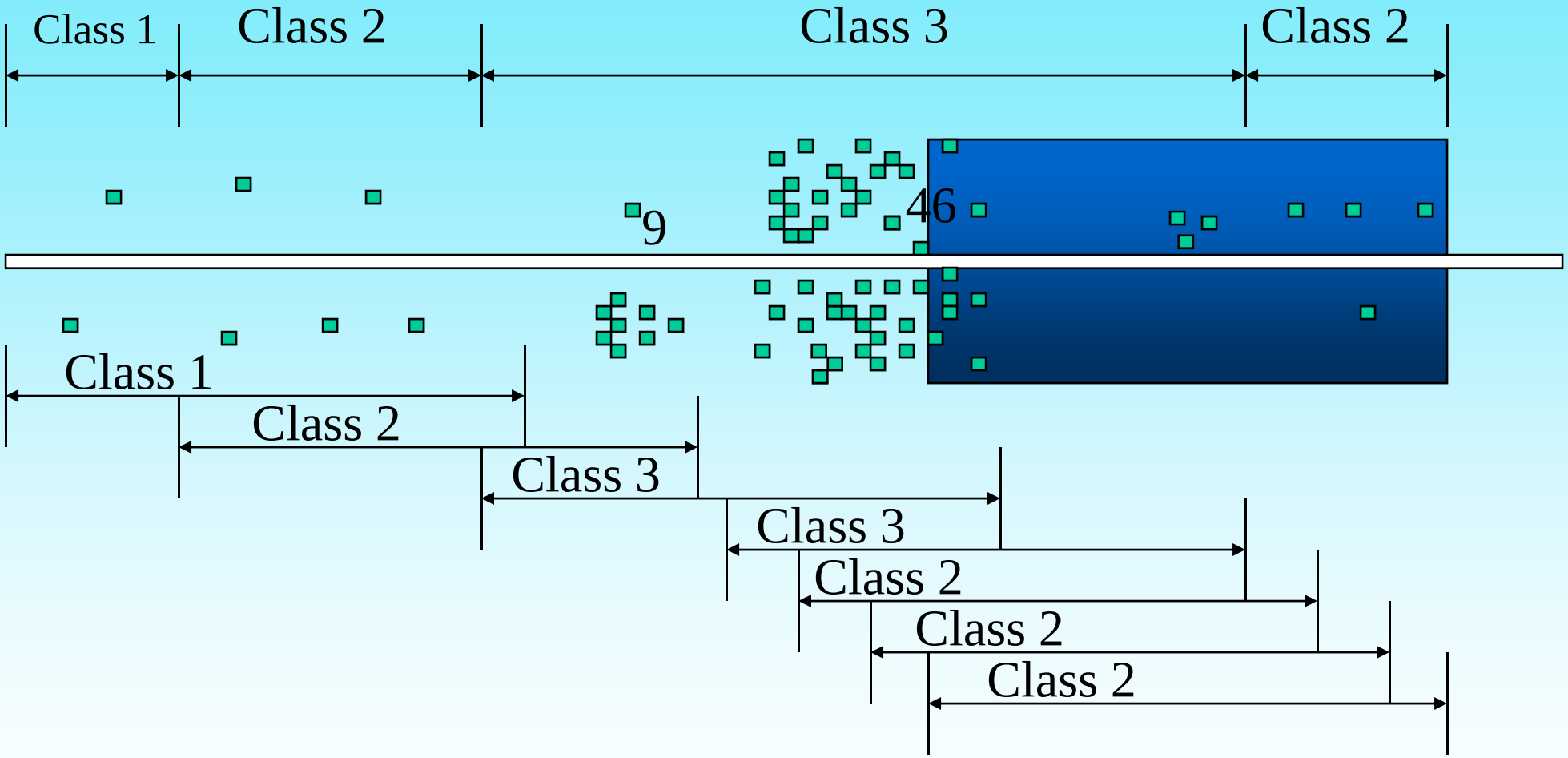
Continuous Sliding Mile



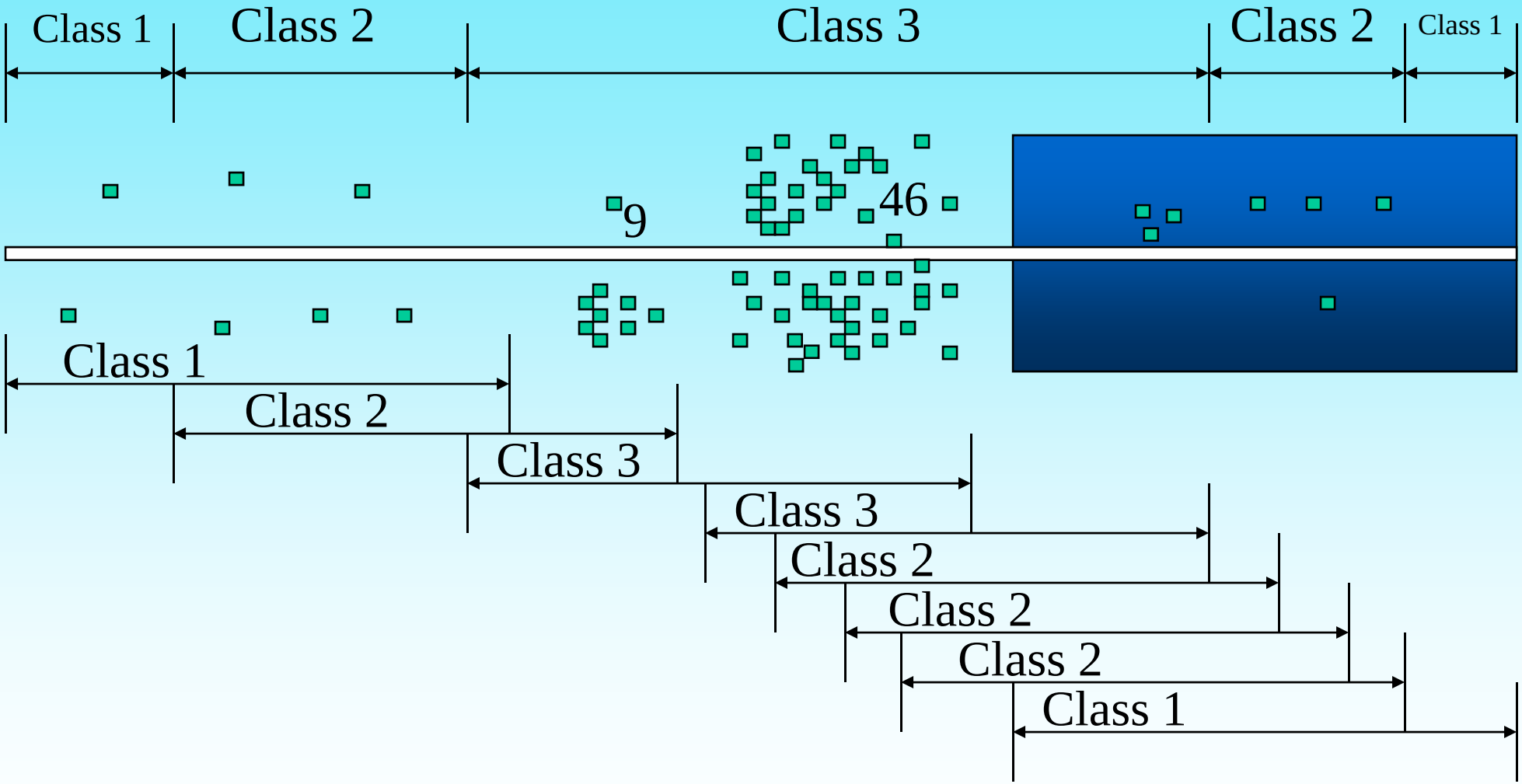
Continuous Sliding Mile



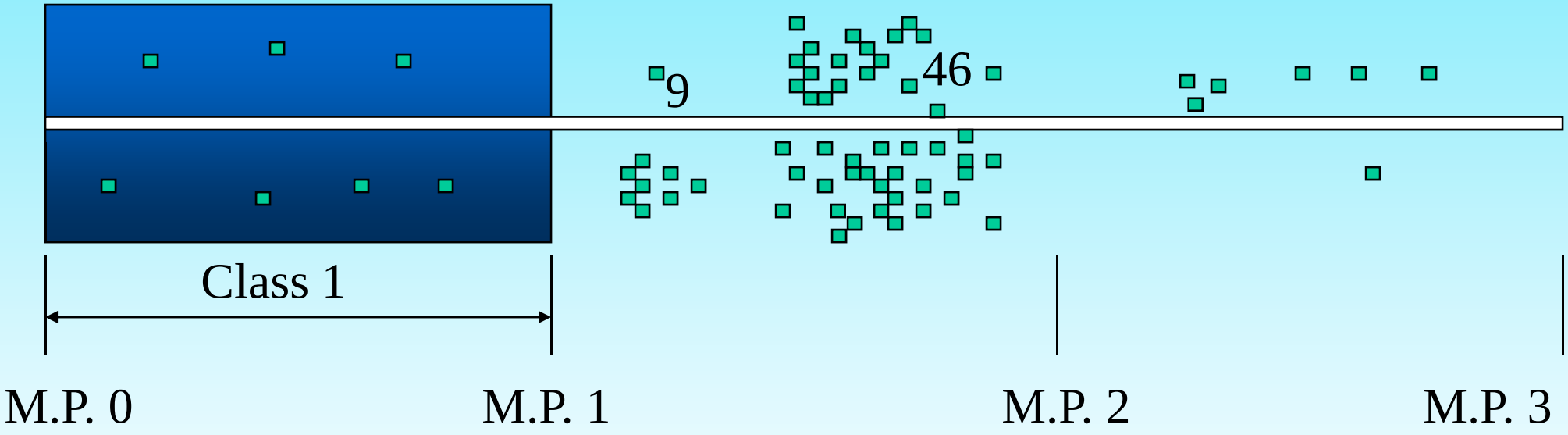
Continuous Sliding Mile



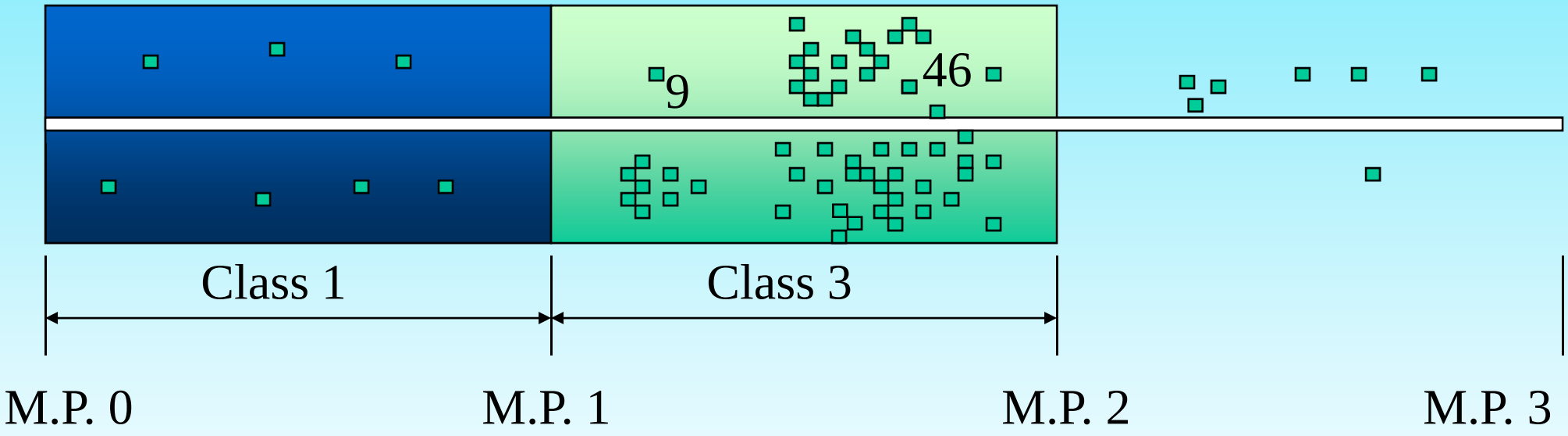
Continuous Sliding Mile



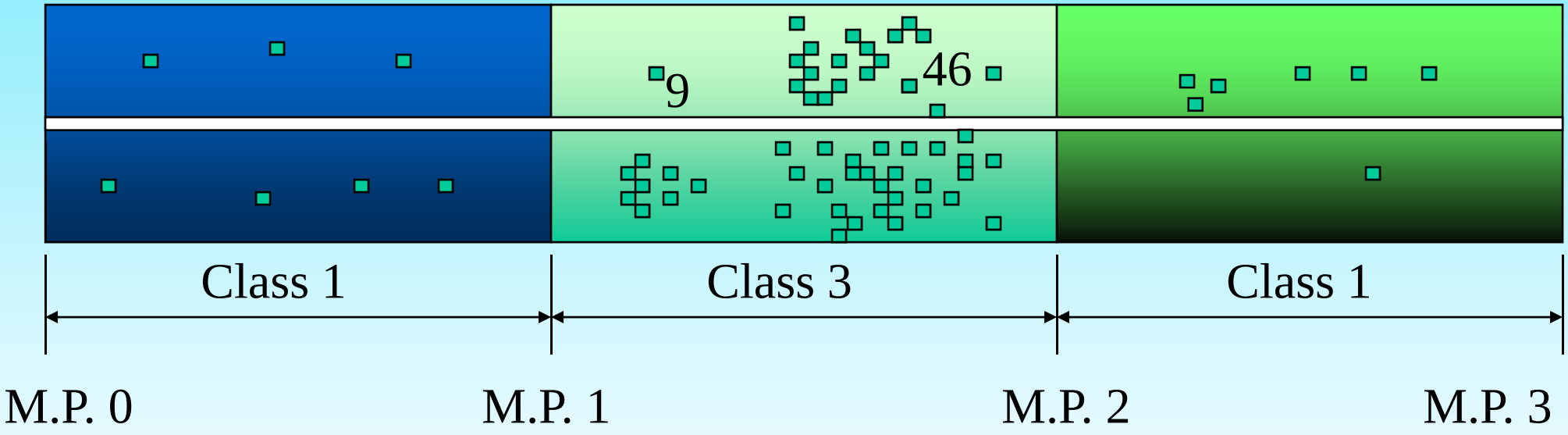
Class Location Determination



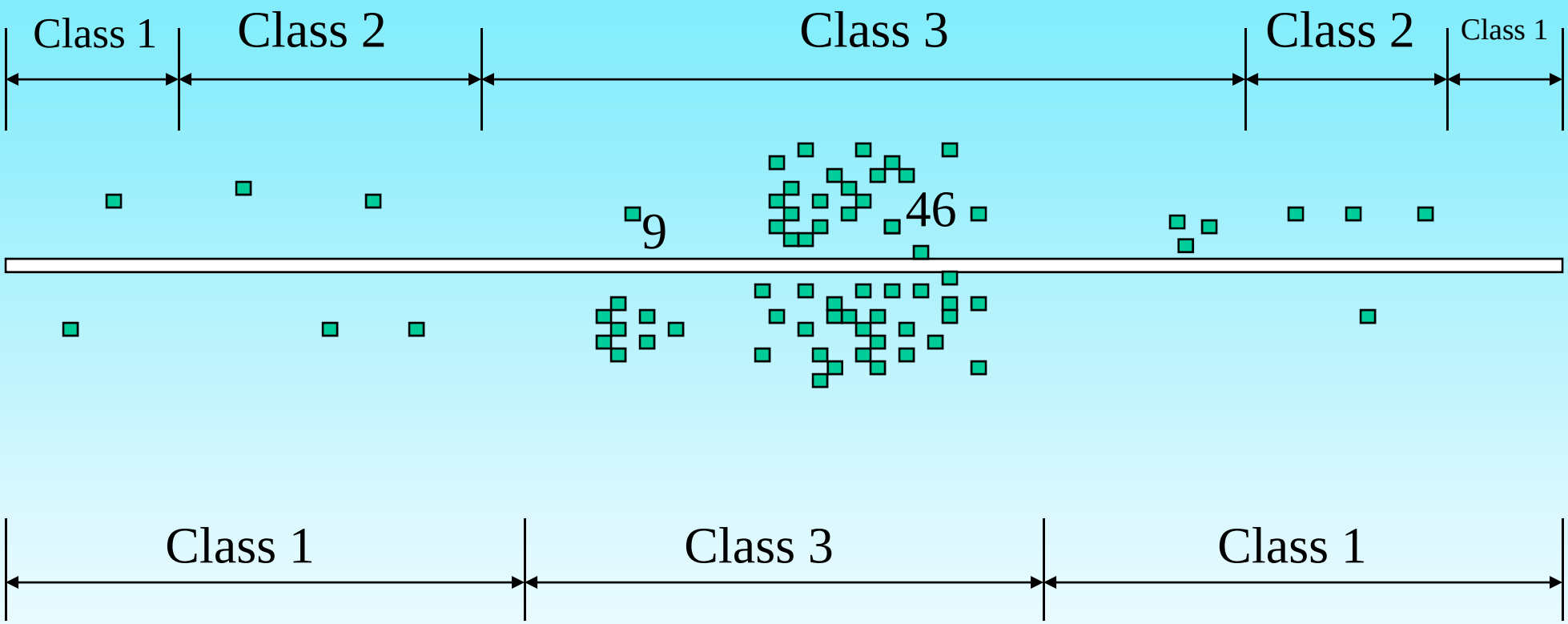
Class Location Determination



Class Location Determination



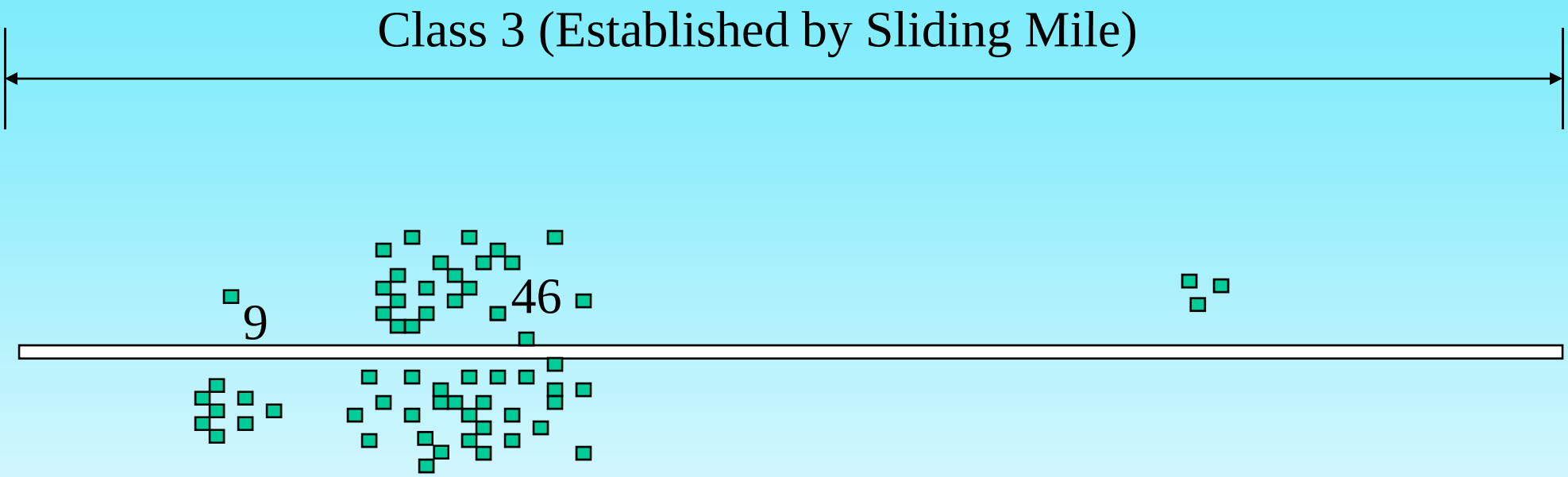
Continuous Sliding Mile



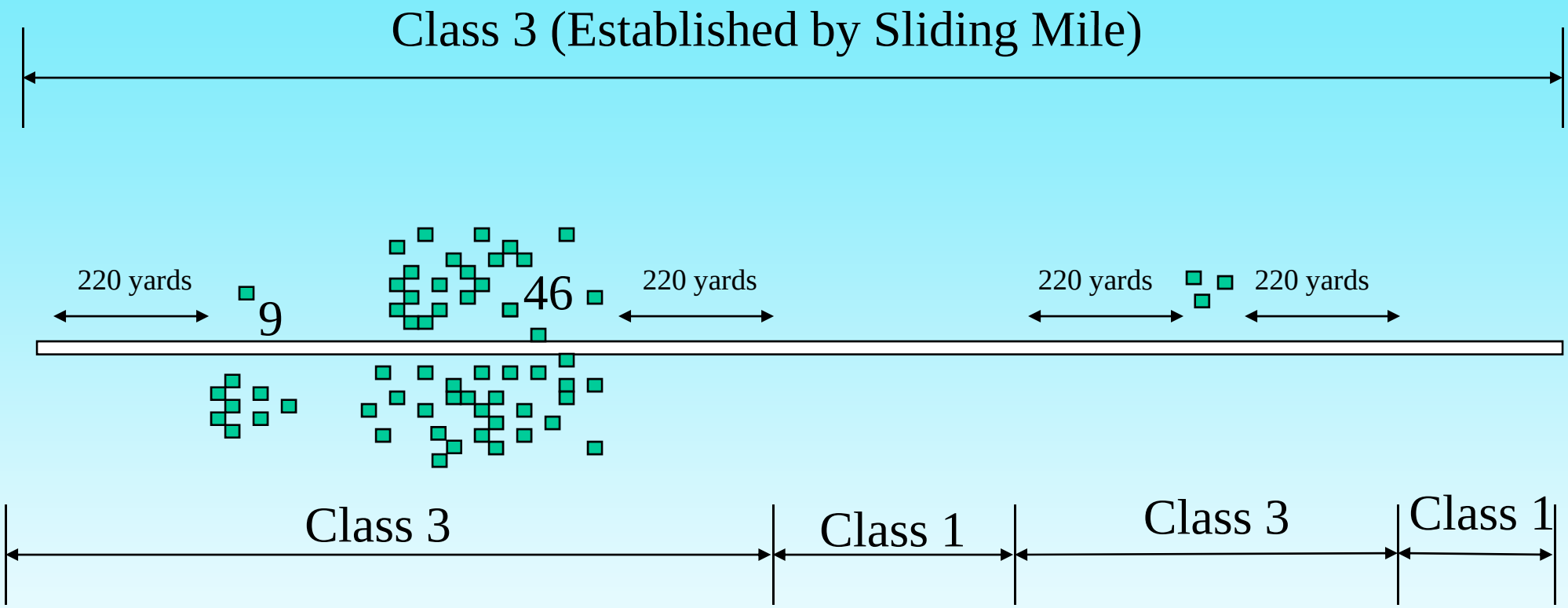
End-to-End Mile

Clustering

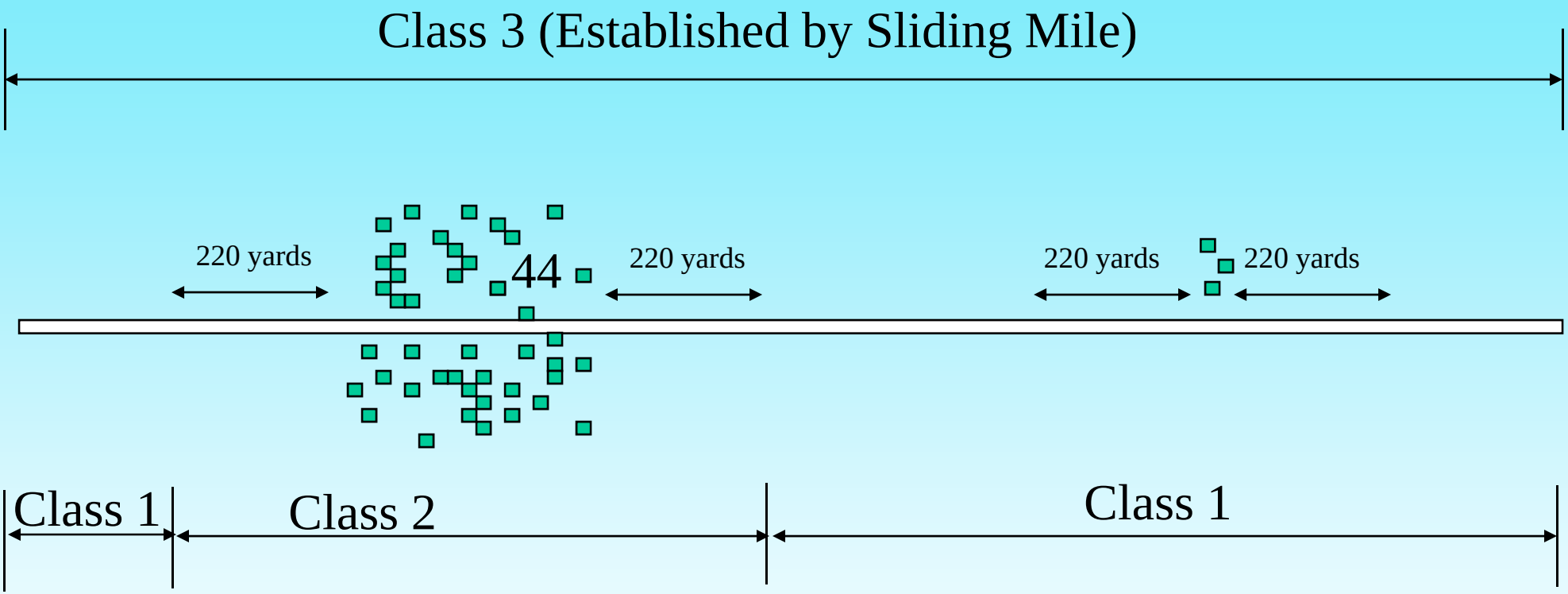
Clustering



Clustering

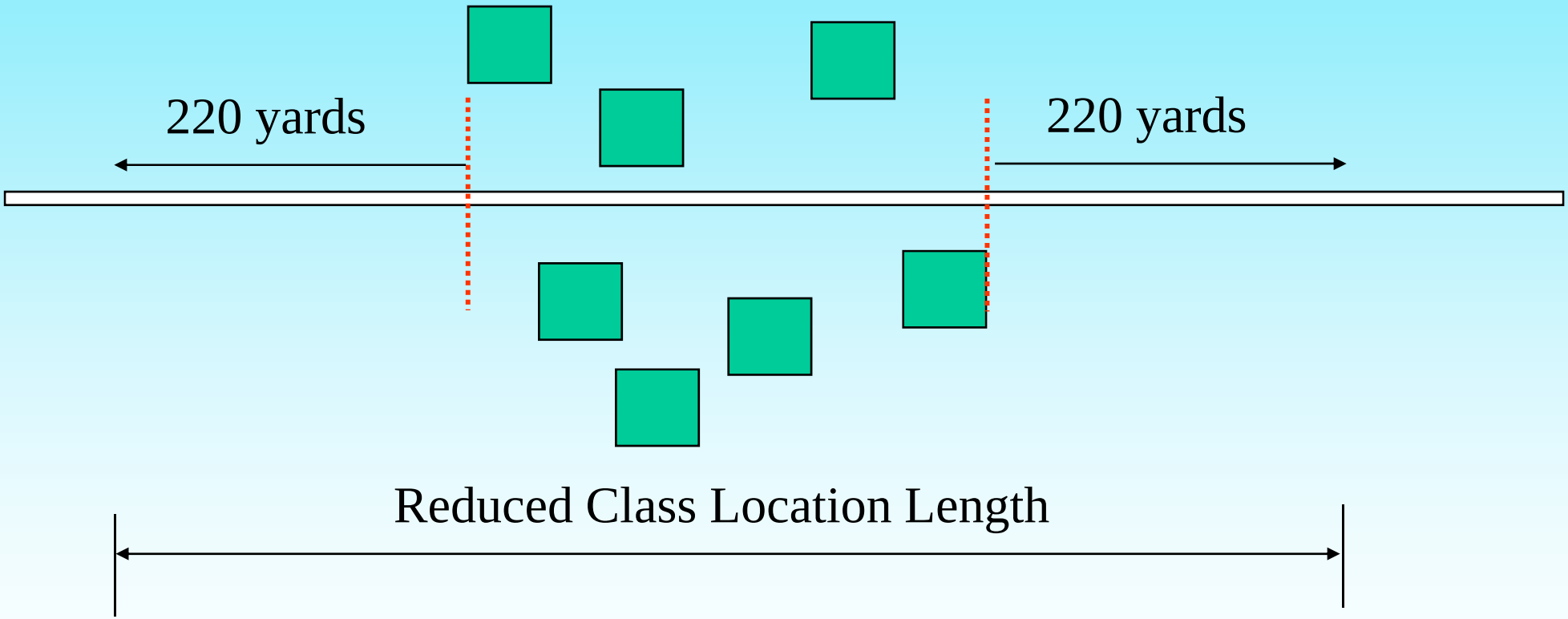

Class 3 (Established by Sliding Mile)
220 yards
9
46
220 yards
220 yards
220 yards
Class 3
Class 1
Class 3
Class 1

Incorrect Clustering Application



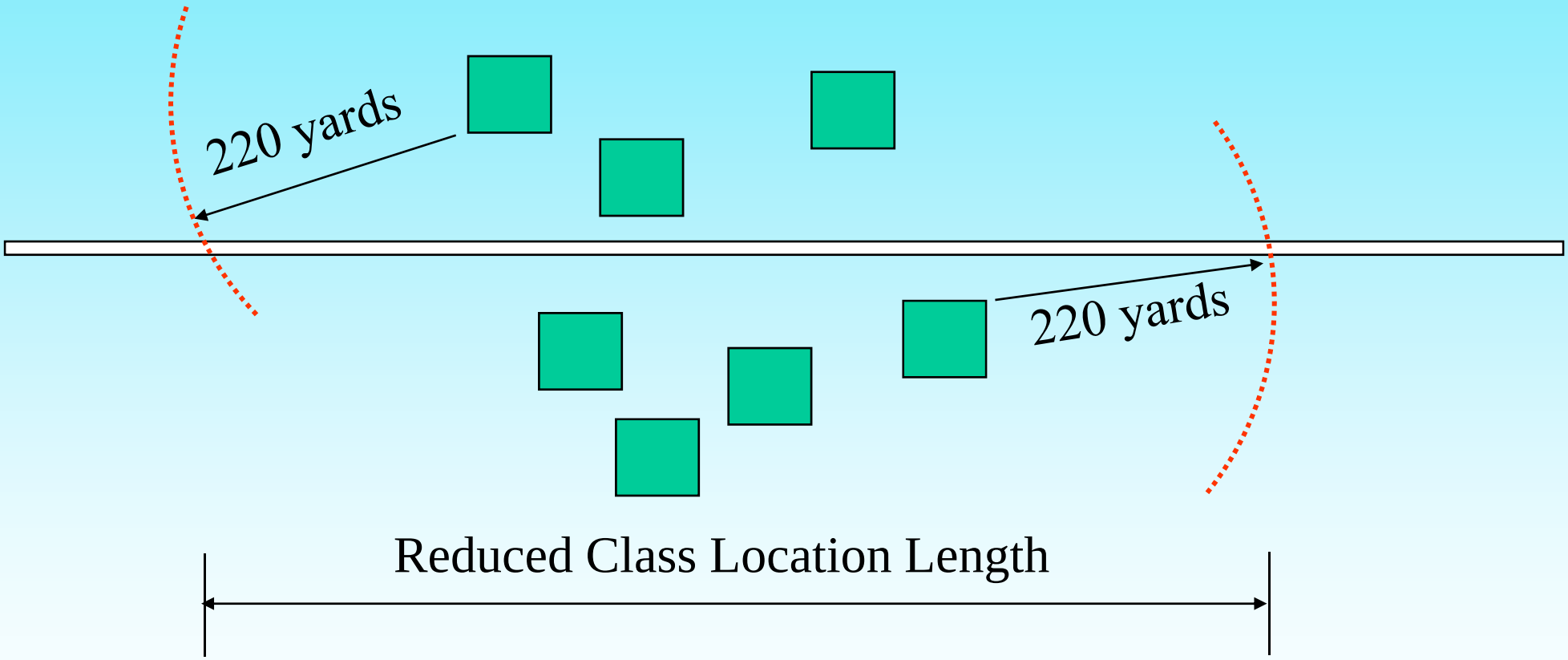
Clustering Limits

Perpendicular Method

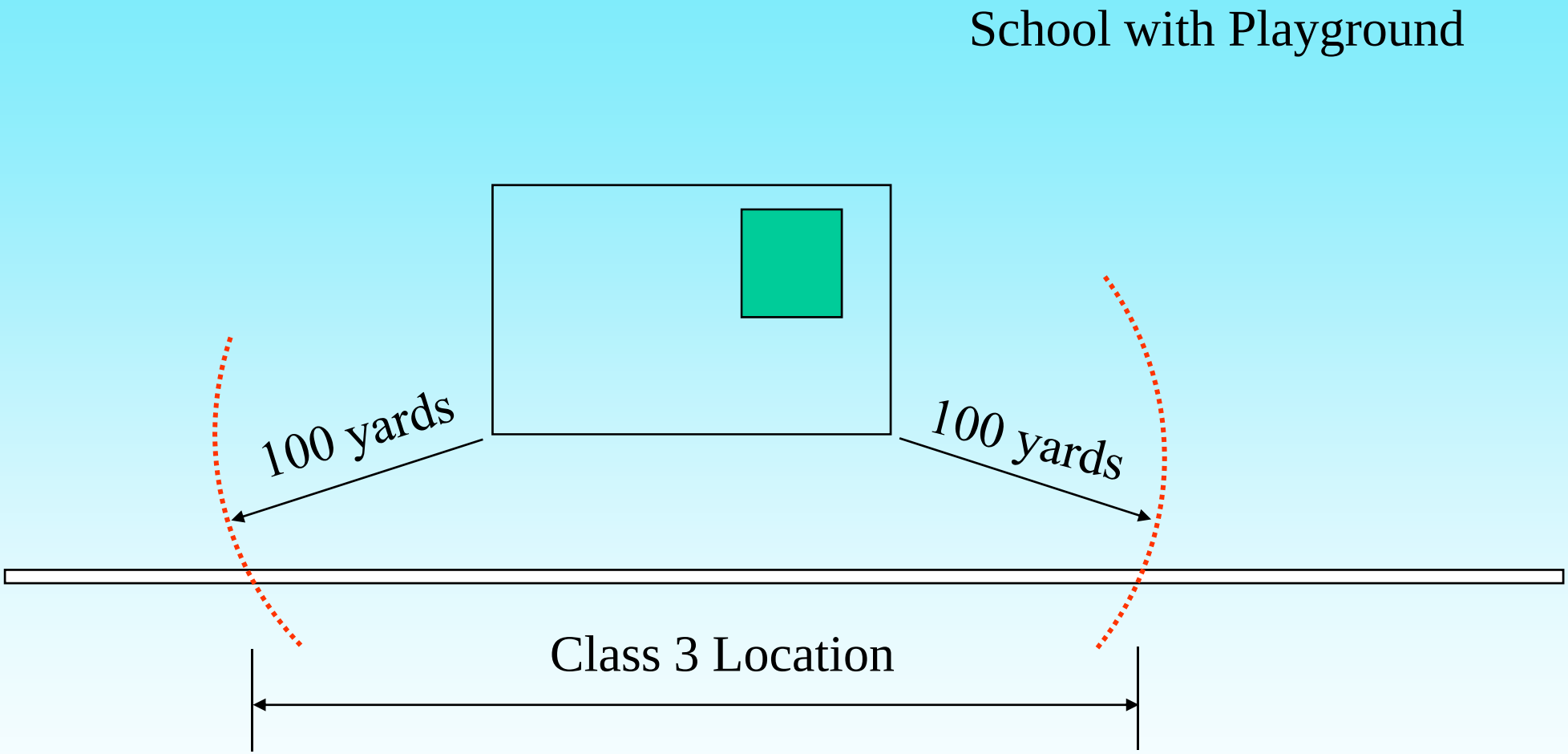


Clustering Limits

Arc Method



Class 3 – Small Well Defined Area



§192.619 - All Pipelines

Lowest **of the following:**

(a)(1) Design

(a)(2) Test Pressure

(a)(3) MOP during the 5 years preceding July 1, 1970

(a)(4) Maximum Safe Pressure determined by the Operator

§192.619 - All Pipelines

Lowest **of the following:**

(a)(1) Design

(a)(2) Test Pressure

(a)(3) MOP during the 5 years preceding July 1, 1970

(a)(4) Maximum Safe Pressure determined by the Operator

Design of Pipe and Components

Pipe

- For Steel - §192.105
- For Plastic - §192.121

Components

- Manufacturers Rating

§192.105 - Design of Steel Pipe

$$P = (2St/D)(F)(E)(T)$$

P = Design Pressure
S = Yield Strength
D = Outside Diameter
t = Wall Thickness
F = Design factor - §192.111
E = Longitudinal joint factor - §192.113
T = Temperature derating factor - §192.115

Converted or Uprated Lines

- **If any variable necessary to determine the design pressure under the design formula is unknown, one of the following is used;**

- **Eighty percent of the first test pressure that produces yield under N5.0 of ASME B31.8; or**

- **If the pipe is 12.750 or less and is not tested to yield, 200psig.**

§192.619(a)(1)

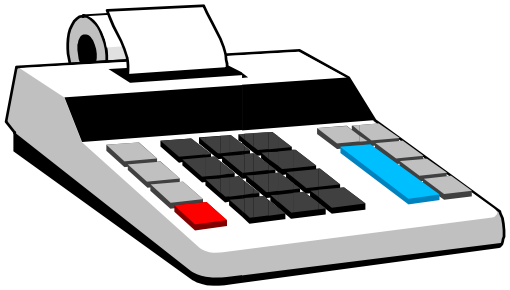
Pipe Specifications

API 5L
Grade B
8"
.322" wt.

$$P = 2St/D$$

$$P = (2)(35{,}000)(.322)/8.625$$

$$P = 2613\#$$



Equivalent Pressure at 100% SMYS

§192.111

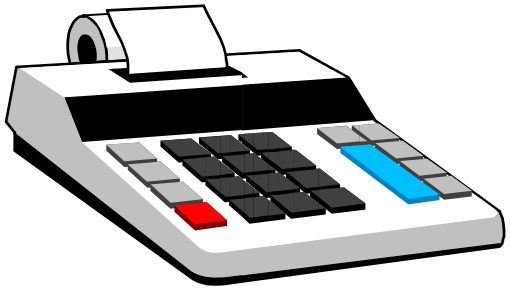
$$P = \frac{2St}{D}(F)$$

Class location	Design factor (F)
1	.72
2	.60
3	.50
4	.40

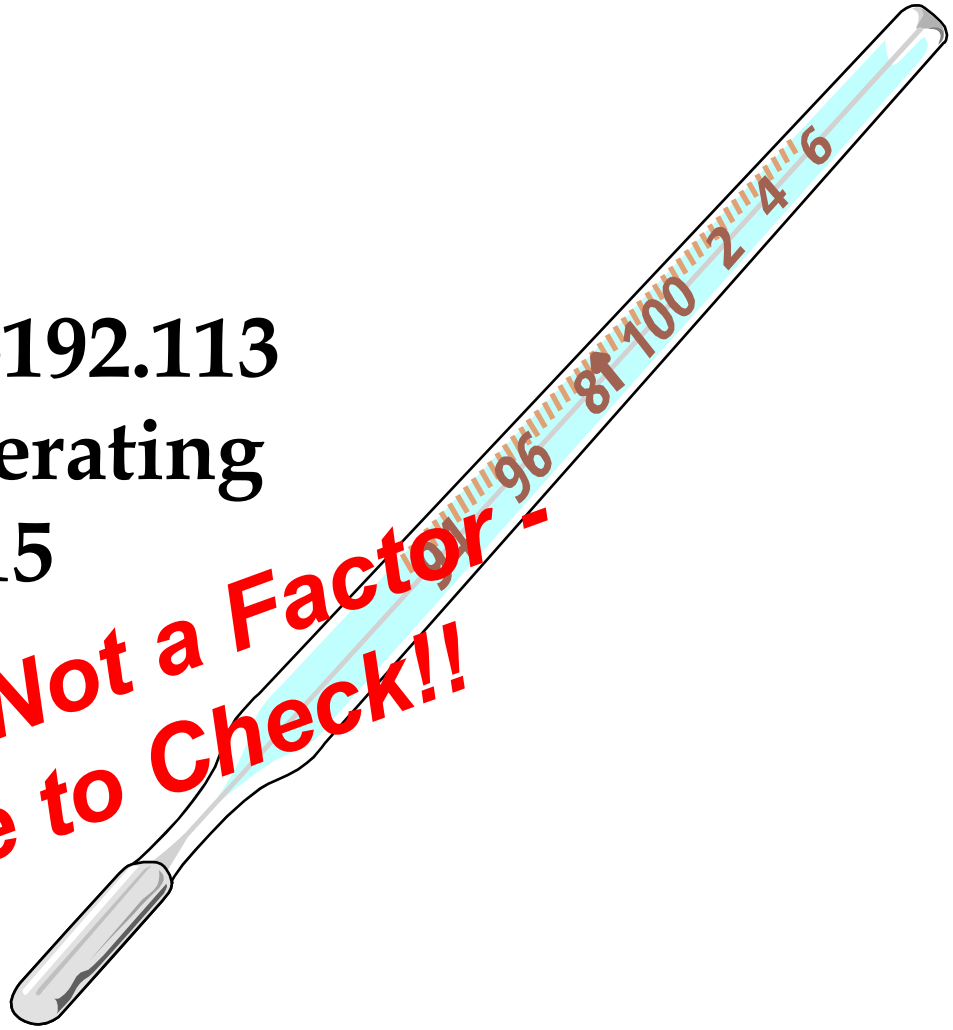
For a Class 3 Location

$$P = \frac{(2)(35{,}000)(.322)}{8.625}(0.50)$$

P= 1307#



- E = Longitudinal Joint Factor - §192.113
- T = Temperature Derating factor - §192.115



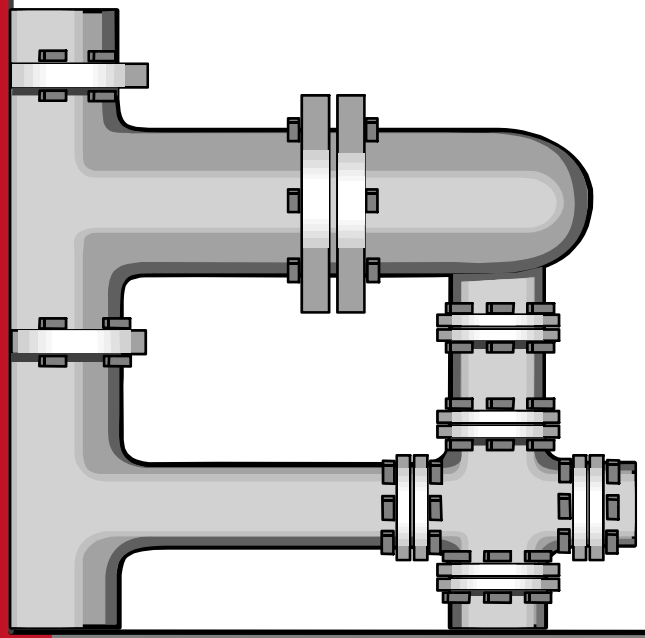
Usually Not a Factor - Be Sure to Check!!

Components

1000 WOG Valve

ANSI Class 300 Flange

ANSI Class 600 Valve



Components

- 1000 WOG Valve - 1000#
- ANSI Class 300 Flange - 720#
- ANSI Class 600 Valve - 1440#

Manufacturers Rating

Design

Components = 720#

Pipe = 1307#

§192.619 - All Pipelines

Lowest **of the following:**

(a)(1) Design = 720#

(a)(2) Test Pressure

(a)(3) MOP during the 5 years preceding July 1, 1970

(a)(4) Maximum Safe Pressure determined by the Operator

Testing - Steel > 100#

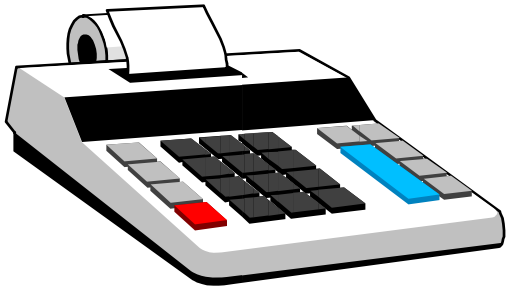
Class location	Installed before (Nov. 12, 1970)	Installed after (Nov. 11, 1970)	Covered under §192.14
1	1.1	1.1	1.25
2	1.25	1.25	1.25
3	1.4	1.5	1.5
4	1.4	1.5	1.5

§192.619(a)(2)(ii)

Test Pressure / Factor

Test Pressure - 1964 = 1500#

For Class 3 -



1500/1.4 = 1071#

§192.619 - All Pipelines

Lowest **of the following:**

(a)(1) Design = 720#

(a)(2) Test Pressure = 1071#

(a)(3) MOP during the 5 years preceding July 1, 1970

(a)(4) Maximum Safe Pressure determined by the Operator

MOP

- **5 years preceding 7/1/70**

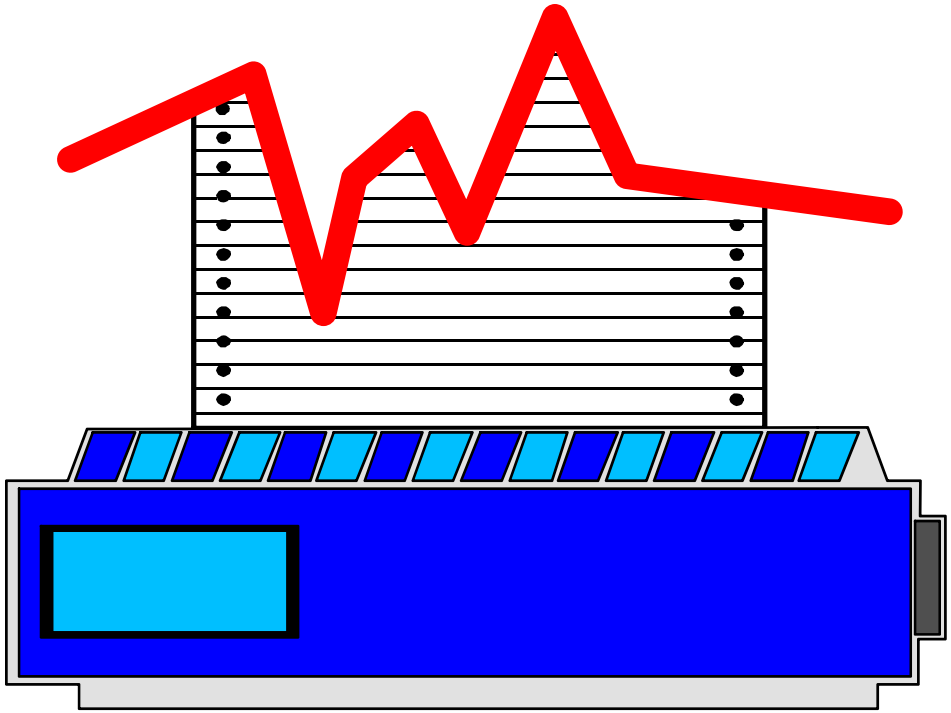
Unless:

- **Tested in accordance §192.619(a)(2) after July 1, 1965**

- **Uprated in accordance with Subpart K of this part.**

MOP

Operating Charts for 1968 - 850#



§192.619 - All Pipelines

Lowest **of the following:**

(a)(1) Design = 720#

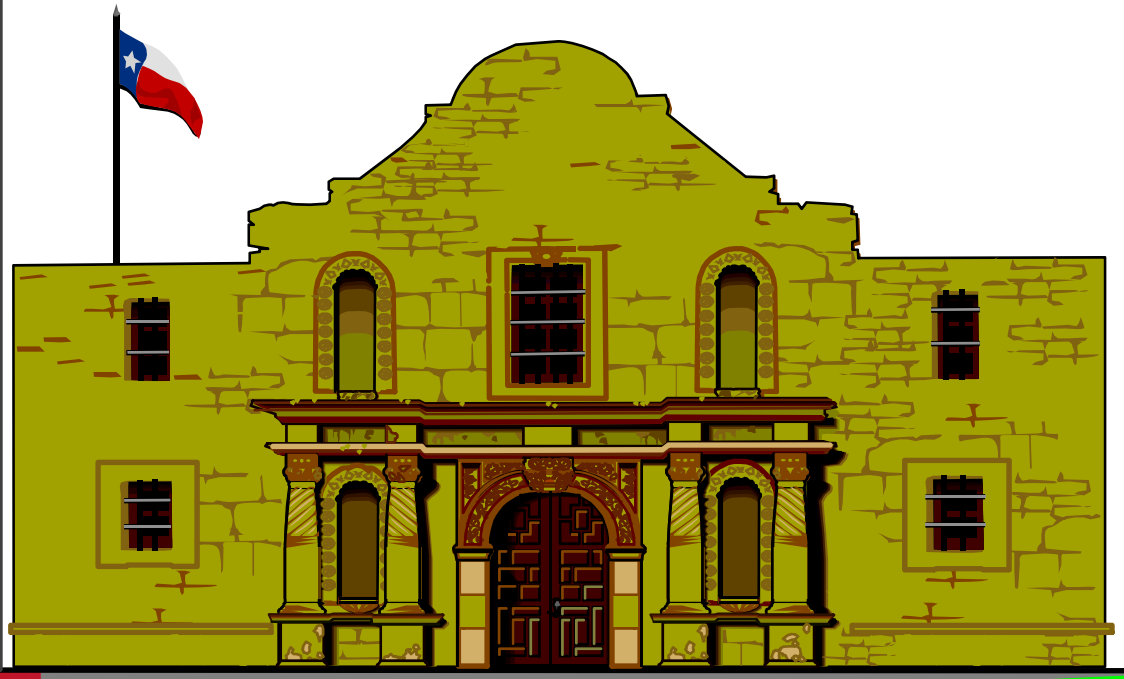
(a)(2) Test Pressure = 1071#

(a)(3) MOP = 850#

(a)(4) Maximum Safe Pressure determined by the Operator

Maximum Safe Pressure

Considering:



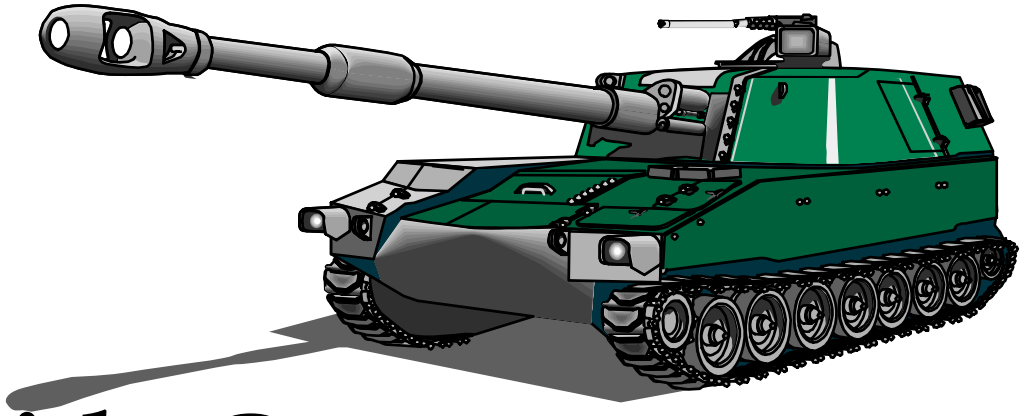
History

Corrosion

Actual Operating Pressure

§192.619(b)

Maximum Safe Pressure



If used:

Must provide Overpressure Protection as required by §192.195

§192.619(c)

Notwithstanding

Notwithstanding the other requirements of this section, an operator may operate a segment of pipeline found to be in satisfactory condition, considering its operating and maintenance history, at the highest actual operating pressure to which the segment was subjected during the 5 years preceding July 1, 1970.

§192.619(c)
Notwithstanding

Design = 720#

Test Pressure = 1071#

MOP = 850#