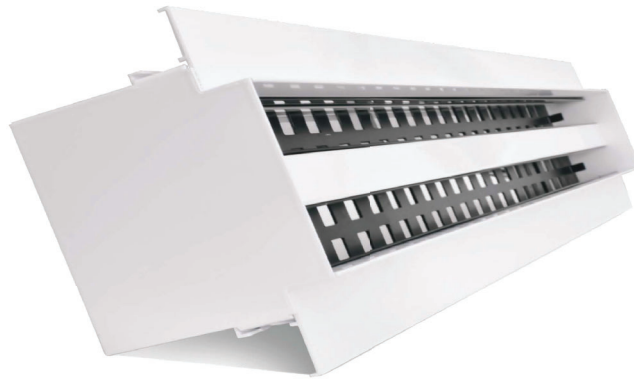




**CASTLE**  
ENGINEERING  
INDUSTRIES



# Hidden Flowbar & Frameless Linear Slot Diffuser



**1** Exposed Type



**2** Flushed Type



**3** Angular Type

## MODELS

**4** Hidden Slot Diffuser

## FEATURES

**1**

Four different modules to suit all applications(Angular , Exposed and flushed Types).

**2**

Standard 1 to 4 slots with slot sizes 2 ,1 and 3 inches.

**3**

Section lengths up to 12 feet are standard.

**4**

Optional Matched Plenum Box.

## Flow Bar Diffuser:

### Model Use

Castle Model FBD is a continuous slot system which allows the air distribution to become inconspicuous, while fully integrating and complementing the ceiling system and other ceiling components.

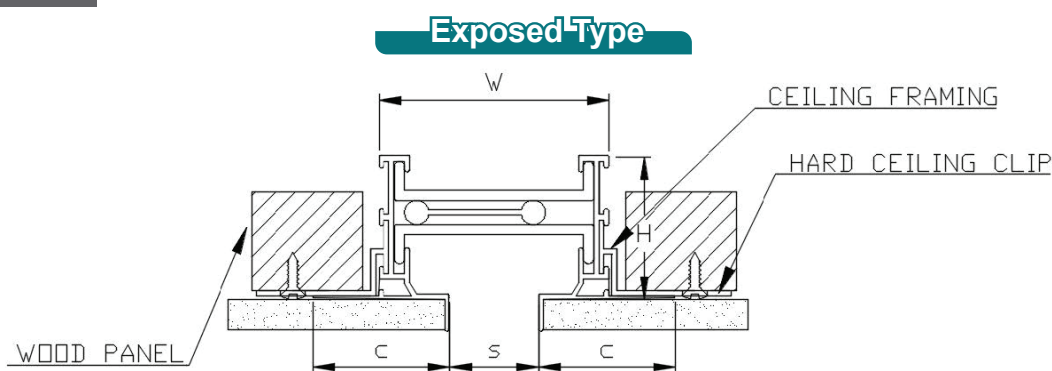
### Unit Design

Castle Model FBD satisfy both the architect's and engineer's requirements for designing an air distribution system that will maintain optimum room air conditions while being inconspicuous to the viewer.

### Design Shaping

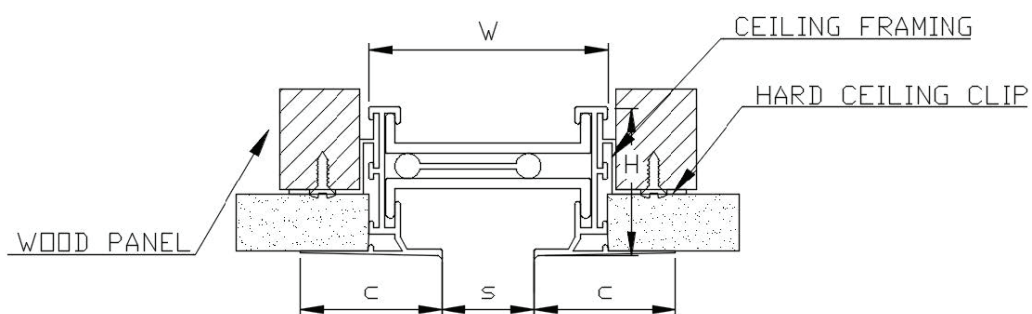
Castle Model FBD satisfy both the architect's and engineer's requirements for designing an air distribution system that will maintain optimum room air conditions while being inconspicuous to the viewer.

### Dimensions



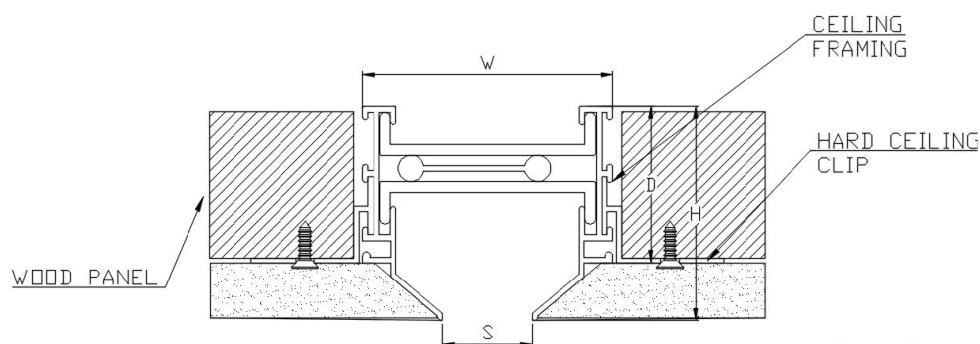
| Slot Width "Inch" | W "mm" | D "mm" | H "mm" |
|-------------------|--------|--------|--------|
| 1"                | 69.6   | 41.2   | 42.8   |
| 2"                | 95     | 41.2   | 42.8   |
| 3"                | 120.4  | 41.2   | 42.8   |

### Flushed Type



| Slot Width "Inch" | W "mm" | D "mm" | H "mm" |
|-------------------|--------|--------|--------|
| 1"                | 69.6   | 41.2   | 42.8   |
| 2"                | 95     | 41.2   | 42.8   |
| 3"                | 120.4  | 41.2   | 42.8   |

### Angular Type



| Slot Width "Inch" | W "mm" | D "mm" | H "mm" |
|-------------------|--------|--------|--------|
| 1"                | 69.6   | 42.8   | 58.7   |
| 2"                | 95     | 42.8   | 58.7   |
| 3"                | 120.4  | 42.8   | 58.7   |

**Performance Data**

| No. of Slots | Slot Width 1"      |       |       |       |       |       |       |       |
|--------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 Slot       | Air flow`CFM/Ft`   | 25    | 40    | 55    | 70    | 85    | 100   | 115   |
|              | PS`Inch Water`     | 0.028 | 0.072 | 0.136 | 0.221 | 0.325 | 0.450 | 0.596 |
|              | Noise Criteria`NC` | 10    | 16    | 26    | 33    | 39    | 44    | 49    |
|              | Throw`Feet`        | 8-14  | 8-14  | 8-14  | 8-14  | 8-14  | 8-14  | 8-14  |
| 2 Slot       | Air flow`CFM/Ft`   | 50    | 75    | 100   | 125   | 150   | 175   | 200   |
|              | PS`Inch Water`     | 0.025 | 0.063 | 0.113 | 0.176 | 0.253 | 0.345 | 0.450 |
|              | Noise Criteria`NC` | 10    | 17    | 26    | 33    | 39    | 44    | 48    |
|              | Throw`Feet`        | 11-20 | 17-25 | 20-29 | 23-32 | 25-35 | 27-38 | 29-41 |
| 3 Slot       | Air flow`CFM/Ft`   | 75    | 100   | 150   | 180   | 250   | 290   | 350   |
|              | PS`Inch Water`     | 0.022 | 0.055 | 0.10  | 0.155 | 0.24  | 0.32  | 0.40  |
|              | Noise Criteria`NC` | 12    | 17    | 27    | 34    | 39    | 44    | 49    |
|              | Throw`Feet`        | 12-23 | 19-28 | 24-35 | 26-39 | 29-40 | 30-45 | 35-45 |
| 4 Slot       | Air flow`CFM/Ft`   | 100   | 150   | 200   | 250   | 300   | 350   | 400   |
|              | PS`Inch Water`     | 0.020 | 0.052 | 0.090 | 0.135 | 0.20  | 0.28  | 0.38  |
|              | Noise Criteria`NC` | 15    | 18    | 28    | 35    | 40    | 45    | 50    |
|              | Throw`Feet`        | 15-27 | 22-35 | 27-40 | 31-44 | 33-49 | 36-52 | 39-57 |

| No. of Slots | Slot Width 2"      |       |       |       |       |       |       |       |
|--------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 Slot       | Air flow`CFM/Ft`   | 30    | 50    | 70    | 90    | 110   | 130   | 150   |
|              | PS`Inch Water`     | 0.02  | 0.057 | 0.111 | 0.184 | 0.274 | 0.383 | 0.51  |
|              | Noise Criteria`NC` | 10    | 11    | 22    | 30    | 36    | 41    | 46    |
|              | Throw`Feet`        | 9-16  | 14-20 | 17-24 | 19-27 | 21-30 | 23-33 | 25-35 |
| 2 Slot       | Air flow`CFM/Ft`   | 60    | 95    | 130   | 165   | 200   | 235   | 270   |
|              | PS`Inch Water`     | 0.018 | 0.051 | 0.096 | 0.154 | 0.227 | 0.313 | 0.413 |
|              | Noise Criteria`NC` | 10    | 12    | 22    | 30    | 36    | 41    | 46    |
|              | Throw`Feet`        | 12-22 | 19-28 | 23-33 | 26-37 | 29-41 | 31-44 | 33-47 |
| 3 Slot       | Air flow`CFM/Ft`   | 90    | 145   | 200   | 250   | 285   | 385   | 420   |
|              | PS`Inch Water`     | 0.016 | 0.045 | 0.08  | 0.14  | 0.21  | 0.29  | 0.4   |
|              | Noise Criteria`NC` | 13    | 15    | 23    | 33    | 38    | 42    | 47    |
|              | Throw`Feet`        | 16-30 | 25-39 | 31-46 | 35-37 | 39-50 | 41-60 | 44-65 |
| 4 Slot       | Air flow`CFM/Ft`   | 120   | 190   | 260   | 325   | 385   | 450   | 525   |
|              | PS`Inch Water`     | 0.015 | 0.041 | 0.065 | 0.125 | 0.185 | 0.26  | 0.385 |
|              | Noise Criteria`NC` | 15    | 17    | 25    | 35    | 40    | 45    | 48    |
|              | Throw`Feet`        | 16-30 | 25-39 | 31-46 | 35-37 | 39-50 | 41-60 | 44-65 |

| No. of Slots | Slot Width 3"      |       |       |       |       |       |       |       |
|--------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 Slot       | Air flow`CFM/Ft`   | 35    | 55    | 75    | 100   | 120   | 150   | 160   |
|              | PS`Inch Water`     | 0.02  | 0.057 | 0.111 | 0.184 | 0.274 | 0.383 | 0.51  |
|              | Noise Criteria`NC` | 11    | 12    | 23    | 31    | 37    | 42    | 46    |
|              | Throw`Feet`        | 10-17 | 15-22 | 18-25 | 20-28 | 22-31 | 24-33 | 26-35 |
| 2 Slot       | Air flow`CFM/Ft`   | 60    | 120   | 180   | 240   | 300   | 360   | 420   |
|              | PS`Inch Water`     | 0.01  | 0.044 | 0.1   | 0.177 | 0.277 | 0.399 | 0.543 |
|              | Noise Criteria`NC` | 10    | 10    | 21    | 30    | 37    | 43    | 48    |
|              | Throw`Feet`        | 10-21 | 21-32 | 27-39 | 32-45 | 35-50 | 39-55 | 42-59 |
| 3 Slot       | Air flow`CFM/Ft`   | 100   | 155   | 210   | 290   | 350   | 425   | 450   |
|              | PS`Inch Water`     | 0.009 | 0.04  | 0.085 | 0.15  | 0.2   | 0.31  | 0.5   |
|              | Noise Criteria`NC` | 17    | 15    | 24    | 34    | 40    | 45    | 49    |
|              | Throw`Feet`        | 12-25 | 25-35 | 30-45 | 39-50 | 42-55 | 45-60 | 48-65 |
| 4 Slot       | Air flow`CFM/Ft`   | 135   | 200   | 300   | 385   | 460   | 585   | 625   |
|              | PS`Inch Water`     | 0.008 | 0.037 | 0.075 | 0.12  | 0.18  | 0.28  | 0.485 |
|              | Noise Criteria`NC` | 15    | 18    | 26    | 37    | 42    | 46    | 50    |
|              | Throw`Feet`        | 14-29 | 28-45 | 36-54 | 43-63 | 47-67 | 52-75 | 56-80 |

### Recommended Noise Criteria

| Room Type              |                                         | Noise Criteria (NC) |
|------------------------|-----------------------------------------|---------------------|
| Residences, apartments | Living areas                            | 30                  |
|                        | Bathrooms, kitchens, utility rooms      | 35                  |
| Hotels / motels        | Individual rooms or suites              | 30                  |
|                        | Meeting / banquet rooms                 | 30                  |
|                        | Corridors and lobbies                   | 40                  |
|                        | Service / support areas                 | 40                  |
|                        | Executive and private offices           | 30                  |
| Office buildings       | Conference rooms                        | 30                  |
|                        | Teleconference rooms                    | 25                  |
|                        | Open-plan offices                       | 40                  |
|                        | Corridors and lobbies                   | 40                  |
|                        | Unamplified speech                      | 30                  |
| Courtrooms             | Amplified speech                        | 35                  |
|                        | Drama theaters, concert & recital halls | 20                  |
| Performing arts spaces | Music teaching studios                  | 25                  |
|                        | Music practice rooms                    | 30                  |



|                                      |                                                         |    |
|--------------------------------------|---------------------------------------------------------|----|
| <b>Hospitals and clinics</b>         | Patient rooms                                           | 30 |
|                                      | Wards                                                   | 35 |
|                                      | Operating and procedure rooms                           | 35 |
|                                      | Corridors and lobbies                                   | 40 |
| <b>Laboratories</b>                  | Testing/research with minimal speech communication      | 50 |
|                                      | Extensive phone use and speech communication            | 45 |
|                                      | Group teaching                                          | 35 |
| <b>Churches, mosques, synagogues</b> | General assembly with critical music programs           | 25 |
| <b>Schools</b>                       | Classrooms                                              | 30 |
|                                      | Large lecture rooms with speech amplification           | 30 |
|                                      | Large lecture rooms without speech amplification        | 25 |
| <b>Libraries</b>                     | —                                                       | 30 |
| <b>Indoor stadiums, gymnasiums</b>   | Gymnasiums and natatoriums                              | 45 |
|                                      | Large seating-capacity spaces with speech amplification | 50 |

### Selection Procedure

- Determine the required CFM per each outlet as per cooling load calculation.
- Select no. of slots, slot width and the length of air outlet that give the required CFM at recommended outlet velocity from performance data tables.

### Selection Procedure Example

-Required 300 CFM as per cooling load calculations.

-Determine the length as per required CFM.

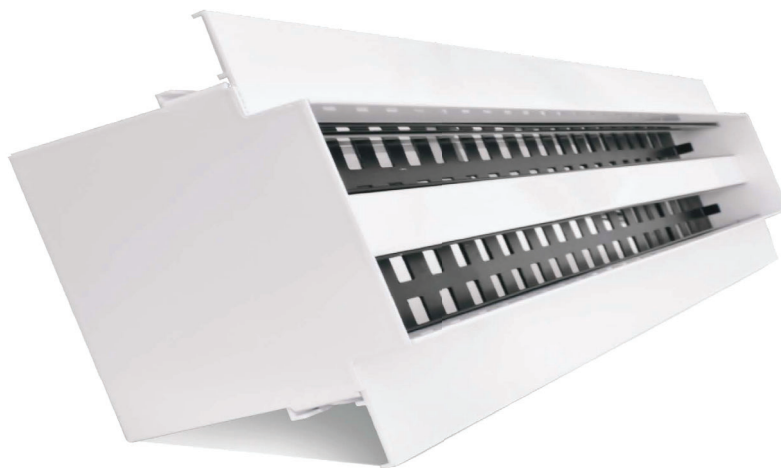
(Example: 40 CFM/feet × 8 feet outlet length,  
50 CFM/feet × 6 feet outlet length, etc.)

Determine the No. of slots as per recommended noise criteria.

You can select:-Slot, 1" width, 8 feet length outlet @ NC = 16,  
(OR)Slot, 1" width, 6 feet length outlet @ NC = 26,  
(OR)Slot, 2" width, 6 feet length outlet @ NC = 11

| No. of Slots  | Slot Width 1"      |       |       |       | No. of Slots  | Slot Width 2"      |       |       |       |
|---------------|--------------------|-------|-------|-------|---------------|--------------------|-------|-------|-------|
|               | Air flow"CFM/Ft"   | 25    | 40    | 55    |               | Air flow"CFM/Ft"   | 30    | 50    | 70    |
| <b>1 Slot</b> | PS"Inch Water"     | 0.028 | 0.072 | 0.136 | <b>1 Slot</b> | PS"Inch Water"     | 0.020 | 0.057 | 0.111 |
|               | Noise Criteria"NC" | 10    | 16    | 26    |               | Noise Criteria"NC" | 10    | 11    | 22    |
|               | Throw"Feet"        | 8-14  | 13-18 | 15-21 |               | Throw"Feet"        | 9-14  | 14-20 | 17-24 |
|               |                    |       |       |       |               |                    |       |       |       |

## Hidden Slot Diffuser



**Model: HSD - C**

Castle Hidden Slot Diffusers offer unique option for continuous linear application in ceiling of ball rooms, auditoriums, in peripheral walls of office spaces etc. HSD is suitable for all commercial and industrial projects which demand single or multi-slot diffusers for ceilings, supply and exhaust air systems. It is used in ceiling as horizontal diffuser or, in some cases, on vertical downward discharge. The ability to produce the tight air pattern from maximum to minimum flow makes the product an excellent choice for Variable Air Volume systems. They are constructed from heavy gauged extruded Aluminium alloy profiles and powder coated finish.

### FEATURES

Flangeless Single / Multi slot flow bar diffusers is suitable for all commercial and industrial projects which demand single or multi-slot diffusers for ceilings, supply and exhaust air systems. They are constructed from heavy gauged extruded Aluminium alloy profiles with electrostatic powder coated finish.

### Constructional Details

**Frame:** Extruded heavy Gauged Aluminium alloy profile.

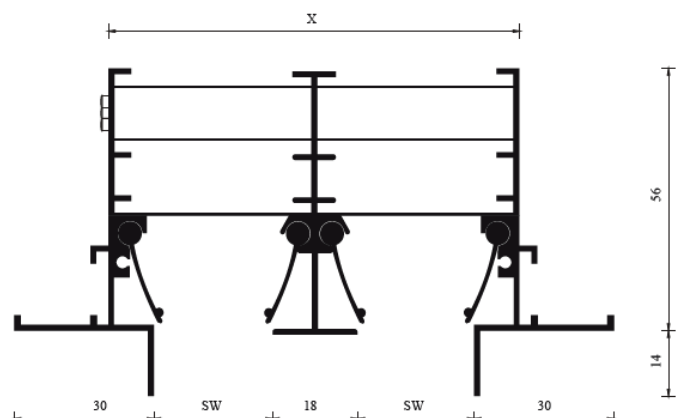
**Pattern Controller:** Extruded heavy Gauged Aluminium alloy profile.

**Damper:** Hit and Miss Damper.

**Finish:** Electrostatic Polyester powder coated system / RAL code

### Dimensional Details

| Slot Width (SW) | No: of Slots | 1  | 2  | 3   |
|-----------------|--------------|----|----|-----|
| 16              | x(mm)        | 37 | 68 | 98  |
| 19              | x(mm)        | 41 | 76 | 110 |
| 25              | x(mm)        | 48 | 86 | 125 |





**Performance Date**

Hidden Slot Diffuser Type C,SW = 16 mmFBD-C/16

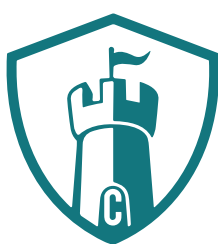
| # of Slots    | CFM/ft     | 10    | 20    | 30    | 40    | 50    | 60    | 75    | 90    | 100   |
|---------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>1 Slot</b> | Pt (in wg) | 0.01  | 0.041 | 0.093 | 0.166 | 0.259 |       |       |       |       |
|               | Throw (ft) | 3-7   | 7-15  | 10-22 | 13-30 | 16-37 |       |       |       |       |
|               | NC         | <15   | 21    | 32    | 41    | 49    |       |       |       |       |
| <b>2 Slot</b> | Pt (in wg) | 0.003 | 0.012 | 0.028 | 0.049 | 0.077 | 0.11  | 0.173 | 0.248 |       |
|               | Throw (ft) | 2-5   | 4-10  | 6-14  | 8-19  | 11-24 | 13-29 | 16-36 | 19-43 |       |
|               | NC         | <15   | <15   | 17    | 25    | 31    | 36    | 42    | 48    |       |
| <b>3 Slot</b> | Pt (in wg) | 0.002 | 0.008 | 0.019 | 0.033 | 0.05  | 0.072 | 0.111 | 0.159 | 0.235 |
|               | Throw (ft) | 2-4   | 4-9   | 6-13  | 8-18  | 10-22 | 12-26 | 15-33 | 17-40 | 21-49 |
|               | NC         | <15   | <15   | <15   | 19    | 25    | 30    | 36    | 41    | 47    |

Hidden Slot Diffuser Type C,SW = 19 mmFBD-C/19

| # of Slots    | CFM/ft     | 10    | 20    | 30    | 40    | 50    | 60    | 75    | 90    | 110   |
|---------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>1 Slot</b> | Pt (in wg) | 0.009 | 0.035 | 0.08  | 0.142 | 0.222 | 0.319 |       |       |       |
|               | Throw (ft) | 3-6   | 6-13  | 9-19  | 11-26 | 14-32 | 17-39 |       |       |       |
|               | NC         | <15   | <15   | 25    | 33    | 40    | 46    |       |       |       |
| <b>2 Slot</b> | Pt (in wg) | 0.002 | 0.01  | 0.022 | 0.199 | 0.199 | 0.061 | 0.138 | 0.199 | 0.297 |
|               | Throw (ft) | 2-4   | 4-9   | 6-13  | 17-39 | 17-39 | 10-22 | 14-33 | 17-39 | 21-48 |
|               | NC         | <15   | <15   | <15   | 17    | 24    | 29    | 35    | 40    | 40    |
| <b>3 Slot</b> | Pt (in wg) | 0.002 | 0.008 | 0.017 | 0.03  | 0.046 | 0.066 | 0.102 | 0.145 | 0.215 |
|               | Throw (ft) | 2-3   | 3-7   | 5-10  | 6-14  | 8-17  | 9-21  | 11-26 | 14-31 | 17-38 |
|               | NC         | <15   | <15   | <15   | <15   | 25    | 20    | 26    | 31    | 37    |

Hidden Slot Diffuser Type C,SW = 25 mmFBD-C/25

| # of Slots    | CFM/ft     | 10    | 20    | 30    | 40    | 50    | 60    | 75    | 90    | 110   |
|---------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>1 Slot</b> | Pt (in wg) | 0.007 | 0.027 | 0.06  | 0.107 | 0.168 | 0.241 |       |       |       |
|               | Throw (ft) | 3-6   | 5-12  | 8-18  | 10-24 | 13-30 | 16-36 |       |       |       |
|               | NC         | <15   | <15   | 20    | 28    | 34    | 40    |       |       |       |
| <b>2 Slot</b> | Pt (in wg) | 0.002 | 0.008 | 0.017 | 0.031 | 0.048 | 0.069 | 0.108 | 0.155 | 0.232 |
|               | Throw (ft) | 2-4   | 3-8   | 5-12  | 7-16  | 9-20  | 10-24 | 13-30 | 16-35 | 19-43 |
|               | NC         | <15   | <15   | <15   | <15   | 19    | 24    | 30    | 35    | 41    |
| <b>3 Slot</b> | Pt (in wg) | 0.001 | 0.005 | 0.011 | 0.019 | 0.03  | 0.042 | 0.066 | 0.094 | 0.139 |
|               | Throw (ft) | 2-4   | 3-7   | 5-11  | 6-15  | 8-18  | 10-22 | 12-27 | 14-33 | 18-40 |
|               | NC         | <15   | <15   | <15   | <15   | <15   | 18    | 24    | 29    | 35    |



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## Location

