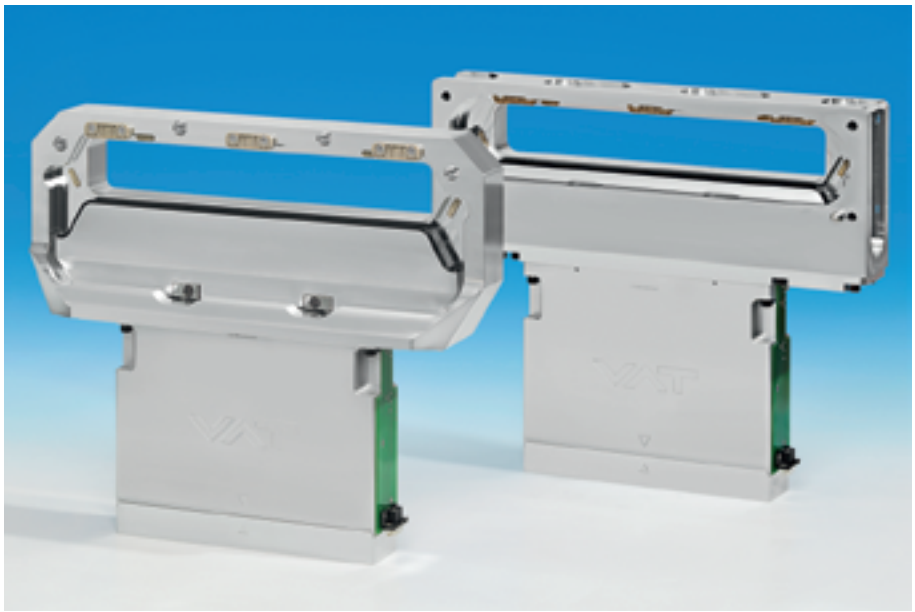
For SEMI applications handling
200, 300 and 450 mm wafers

For load lock / process module isolation

Virtually particle and vibration-free

> 5 million cycles between maintenance

Very easy maintenance
thanks to self-adjusting plate



## Body material

aluminum or stainless steel

## Valve Series 022

double acting
pneumatic actuator
with position indicator

| | DN (D1 x D) | | Ordering numbers | | | |
|---|---|---|---|---|---|---|
| | | | **type B** opening: rear side > seat side with bonnet flange | | **type A** opening: rear side = seat side with bonnet flange | |
| | mm | inch | aluminum | stainless steel | aluminum | stainless steel |
| SEMI E21-94 | 32 x 222 | 1.26 x 8.74 | 02209-**B**A24 | 02209-**B**E24 | 02209-**A**A24 | 02209-**A**E24 |
| SEMI E21-94 | 46 x 236 | 1.81 x 9.29 | 02210-**B**A24 | 02210-**B**E24 | 02210-**A**A24 | 02210-**A**E24 |
| SEMI E21.1-1296 | 50 x 336 | 1.97 x 13.23 | 02212-**B**A24 | 02212-**B**E24 | 02212-**A**A24 | 02212-**A**E24 |
| | 56 x 496 | 2.20 x 19.53 | 02213-**B**A24 | 02213-**B**E24 | 02213-**A**A24 | 02213-**A**E24 |

with solenoid for impulse actuation: 022 . . - . . **4**4 (specify control voltage)

Other opening sizes: see «Options»

## Insert Series 032

double acting
pneumatic actuator
with position indicator

| | DN (D1 x D) | | Ordering numbers | |
|---|---|---|---|---|
| | | | **type C** | |
| | mm | inch | aluminum | stainless steel |
| SEMI E21-94 | 32 x 222 | 1.26 x 8.74 | 03209-**C**A24 | 03209-**C**E24 |
| SEMI E21-94 | 46 x 236 | 1.81 x 9.29 | 03210-**C**A24 | 03210-**C**E24 |
| SEMI E21.1-1296 | 50 x 336 | 1.97 x 13.23 | 03212-**C**A24 | 03212-**C**E24 |
| | 56 x 496 | 2.20 x 19.53 | 03213-**C**A24 | 03213-**C**E24 |

with solenoid for impulse actuation: 032 . . - . . **4**4 (specify control voltage)

Other opening sizes and insert types: see «Options»

## Sealing materials

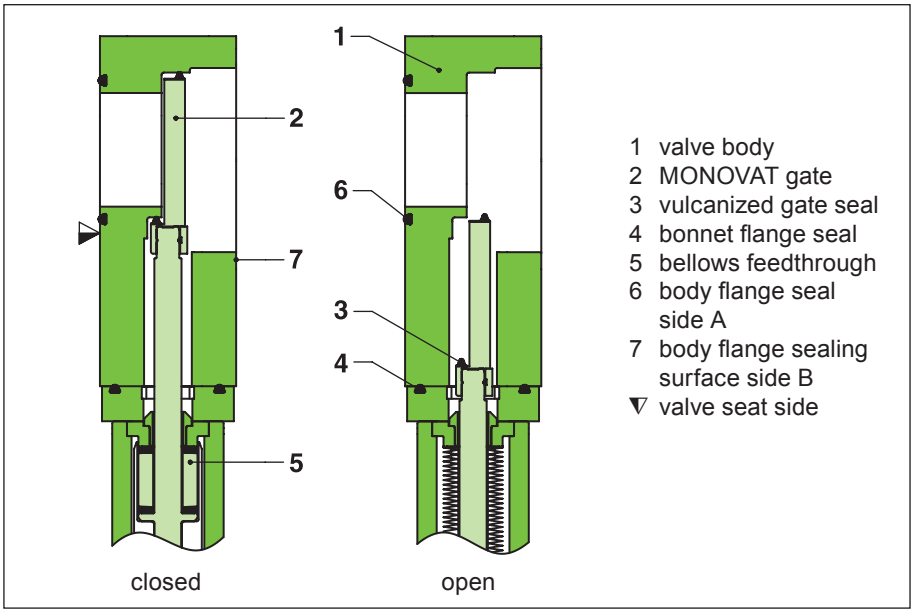
Gate: FKM (VITON, vulcanized)

Bonnet flange: FKM (VITON, O-ring)

Body flange (seat side):
FKM (VITON, O-ring)

## Feedthrough

Bellows feedthrough (welded bellows) inside, protected




C

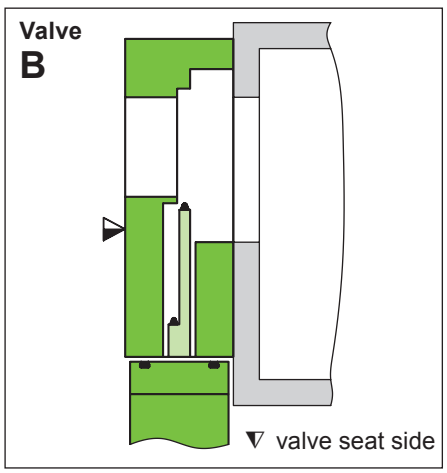
## Features

Compact design

Modular system, same actuator for different valve sizes

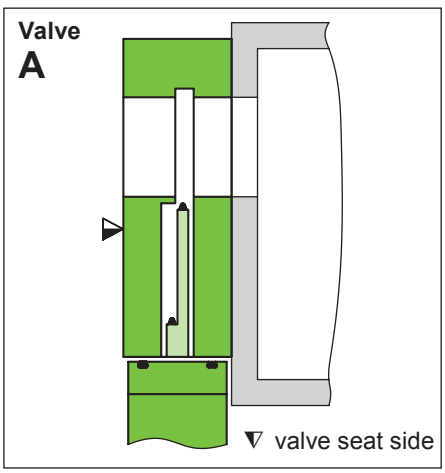
Maintenance-free actuator, self-adjusting gate without detached mounting parts

## Types



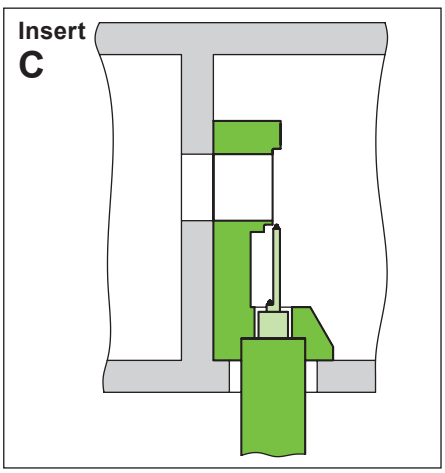

Opening on rear side larger than on seat side

With bonnet flange
Gate service through bonnet flange




Same size of opening on seat side and rear side

With bonnet flange
Gate service through bonnet flange



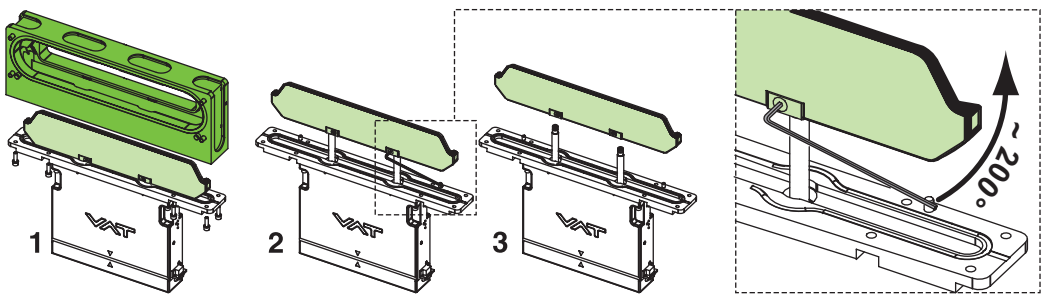

MONOVAT seat mounted inside of chamber

Insert installation from the top
Gate service through chamber

## Easy gate exchange

1 Dismount actuator/gate

2, 3 Remove gate screws:
To do this, apply an Allen wrench and turn it about 200°



## Technical data

Leak rate [1] at body and at seat in mbar ls$^{-1}$

| sealing surface | FKM seal | | FFKM seal | | metal seal |
|---|---|---|---|---|---|
| | body | seat | body | seat | body |
| metal blank (milled / ball polished) | $<1\cdot10^{-9}$ | $<1\cdot10^{-9}$ | $<1\cdot10^{-8}$ | $<1\cdot10^{-7}$ | $<5\cdot10^{-10}$ (stainless steel only) |
| aluminum: hard anodized | $<1\cdot10^{-5}$ | $<1\cdot10^{-4}$ | $<1\cdot10^{-5}$ | $<1\cdot10^{-4}$ | |
| aluminum: nickel-plated | $<1\cdot10^{-9}$ | $<1\cdot10^{-9}$ | $<1\cdot10^{-8}$ | $<1\cdot10^{-7}$ | |

Measuring conditions: Body: 30s, He conc. ≥20%
Seat: 15s, He conc. ≥30%
Automatic leak rate supervision
dp = 1 bar

Pressure range
- Metal blank or nickel-plated: $1\cdot10^{-9}$ mbar to 1.2 bar (abs)
- Aluminum, hard anodized: $1\cdot10^{-6}$ mbar to 1.2 bar (abs)
- Metal seal: $5\cdot10^{-10}$ mbar to 1.2 bar (abs)

Differential pressure on the gate: 1.2 bar in either direction

Differential pressure at opening: ≤ 30 mbar in either direction

Cycles until first service: ≥ 5 million

Temperature [2]

| operating temperature of valve | configurations | | | |
|---|---|---|---|---|
| | valve | | actuator | |
| | body | gate | position indicator | cycle counter |
| ≤ 80°C | aluminum | aluminum | standard | standard |
| ≤150°C | aluminum | aluminum | bakeable | without |
| ≤200°C | stainless steel | stainless steel | without | without |

Pneumatic box (solenoid, non-return valve, pressure controller): <60°C

Material
- Valve body and gate: aluminum: EN AW-6082 (3.2315)
- Valve body and gate: stainless steel: AISI 316L (1.4404, 1.4435)
- Differential pressure tabs, stoppers: PEEK (Polyetheretherketon)
- Bellows end pieces, rod: AISI 316L (1.4404, 1.4435)
- Bellows: AISI 633 (AM 350)
- Clamping piece: AISI 301 (1.4310)

Seal: gate, bonnet: FKM (VITON)

Air connection: internal threads ⅛" (ISO / NPT)

Recommended operating pressure [3]: 2 - 6 bar / 30 - 90 psi

Position indicator: contact rating
- Voltage: ≤ 50 V AC / DC
- Current: ≤ 0.1 A, > 5mA
- Connection: 9 pin subminiature D

Mounting position: any

[1] At room temperature (25°C) and under clean environmental conditions.

[2] Maximum values: depending on operating conditions and sealing materials

[3] In order to maximize the life time of the gate, the operating pressure should be kept as low as possible, however high enough to ensure the required leak rate in the closed valve position. Depending on the length of the sealing line (size of gate), tolerances of the sealing lip, accuracy of the measurement and required leak rate, the operating pressure settings may be slightly beyond the specified pressure range.

| DN (D1 x D) D1 slit height D slit length | | molecular flow conductance | compressed air pressure min. - max. overpressure [3] | | volume of air cylinder | | closing or opening time: with standard pneumatics (400SLPM) | closing or opening time: with high speed actuation kit | weight: aluminum body (type A) | | weight: stainless steel body (type A) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | inch | ls-1 | bar | psi | l | ft3 | s | s | kg | lbs | kg | lbs |
| 32 x 222 | 1.26 x 8.74 | 1590 | 3 - 6 | 45 - 90 | 0.09 | 0.003 | ≤1 | ≤0.5 | 8 | 18 | 16 | 35 |
| 46 x 236 | 1.81 x 9.29 | 3340 | 2 - 4 | 30 - 60 | 0.12 | 0.004 | ≤1 | ≤0.5 | 10 | 22 | 20 | 44 |
| 50 x 336 | 1.97 x 13.23 | 5000 | 2 - 4 | 30 - 60 | 0.12 | 0.004 | ≤1 | ≤0.5 | 12 | 26 | 25 | 55 |

# Options

**Valve body:**

- Opening sizes:
  - 25 x 160 / 210 / 265 / 420 mm (designation 01 / 02 / 03 / 04)
  - 51 x 160 / 210 / 265 / 420 mm (designation 05 / 06 / 07 / 08)
  - Other opening sizes on request, max. 56 x 700 mm
- Body flange:
  - Sealing surface or groove with O-ring
  - Sealing materials (O-ring): FKM, FFKM
  - Metal seal (for stainless steel)
  - Other sealing materials on request
  - Bolt pattern outside or inside of the sealing line
  - Alignment pins, alignment holes
- Surface treatment:
  - Aluminum: hard anodized or nickel-plated
  - Aluminum / stainless steel: ball-polished
- UHV version:
  - Sealing surfaces for metal flange seal
  - Metal seal on bonnet flange
  - Bellows assembly welded to bonnet flange
- Temperature management:
  - Valve body prepared for: liquid cooling (stainless steel) / nitrogen purge / heating cartridges
  - Heating cartridges with or without thermocouple
  - PTC heating cartridges
  - Temperature sensors with/without overtemp. protection
- High speed closing for the connection valve body/bonnet flange (dismounting/mounting of actuator/gate unit)
- Port KF16 for bypass, venting or gauges
- Valve body prepared for customer-specific sensor systems (pressure, temperature, wafer detection)

**Actuator, pneumatics:**

- Pneumatic locking in closed and open position
- High speed venting valve for fast closing and opening times
- Pressure control for the closed valve position
- Bakeable to 150°C
- Manual mechanical locking
- Solenoid for impulse actuation
  12 / 24 VDC, 115 / 230 V 50/60 Hz

**Feedthrough:**

- Bellows feedthrough with optimized particle protection
- Bellows feedthrough with detachable convolutions and optimized particle protection

**Insert:**

- Types L, M, N:
  (Special requirements concerning stiffness and manufacturing tolerances of the chamber design must be considered. VAT recommends using the one-piece C-type.)
  - L: Seat mounted to chamber wall, with bonnet flange, gate service through bonnet flange
  - M: Seat mounted to chamber wall, without bonnet flange, gate service through chamber
  - N: Seat mounted through chamber wall, without bonnet flange, gate service through chamber
- Opening sizes:
  - 25 x 160 / 210 / 265 / 420 mm (designation 01 / 02 / 03 / 04)
  - 51 x 160 / 210 / 265 / 420 mm (designation 05 / 06 / 07 / 08)
  - Other opening sizes on request, max. 56 x 700 mm
- Sealing materials (O-ring):
  - FKM, FFKM
  - Other sealing materials on request
- Surface treatment: see paragraph «Valve body»
- Temperature management: see paragraph «Valve body»

**Gate:**

- Sealing materials for vulcanized seals:
  - FKM, FFKM
  - Other sealing materials on request
- Gate with groove
- Sealing material for gate O-ring:
  - FKM, FFKM
  - Other sealing materials on request
- Surface treatment:
  - Aluminum: hard anodized or nickel-plated
  - Aluminum / stainless steel: bead-blasted or ball-polished
  - Stainless steel: electro polished
- Protective shields against heat radiation / coating / plasma and process gases
- Temperature management:
  - Liquid cooling (stainless steel)
  - Gate with heating conductor

**Position indicator:**

- Bakeable to 150°C
- Double position indicators in both end positions
- Mechanical and electronic magnetic field sensors with LED
- Cycle counter

# Accessories

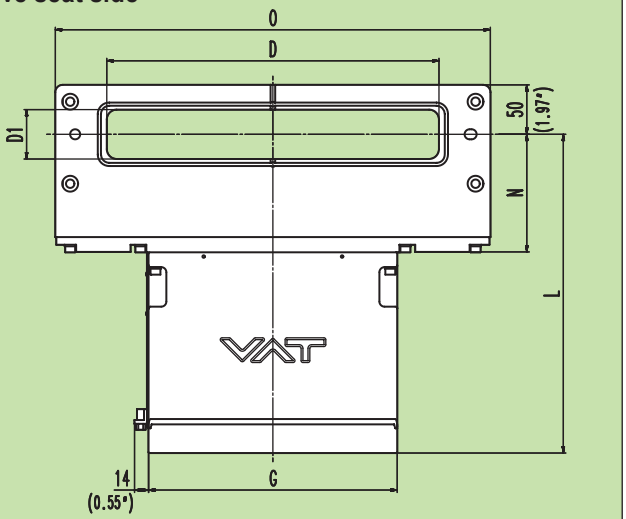
- VATSEAL metal seal for flanges
- Claw (M8) for valves with clamp edges: Ord. No. 32009-QAPR

# Service kit

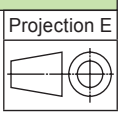
- Seal kit, consisting of valve gate and bonnet flange seal. Ordering number on request.

## Dimensions: Valve Series 022

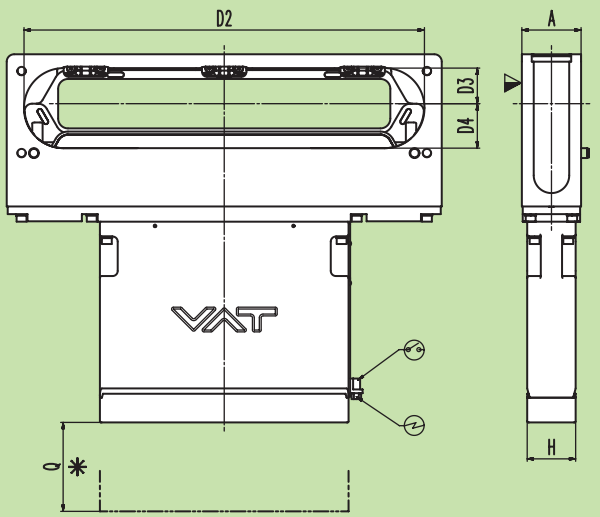
**Valve seat side**



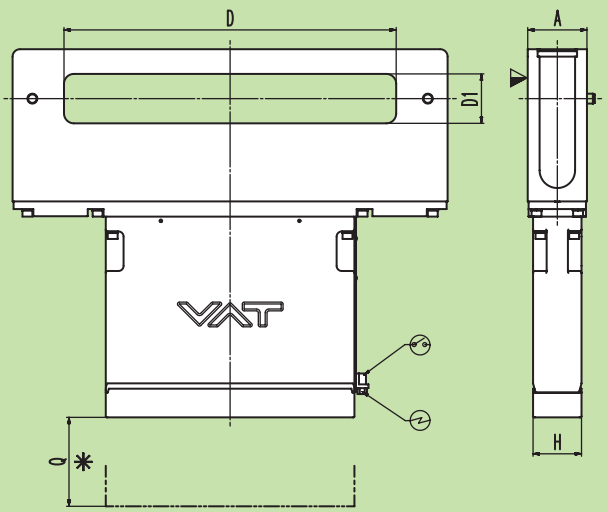

Projection E



**Rear side: type B**



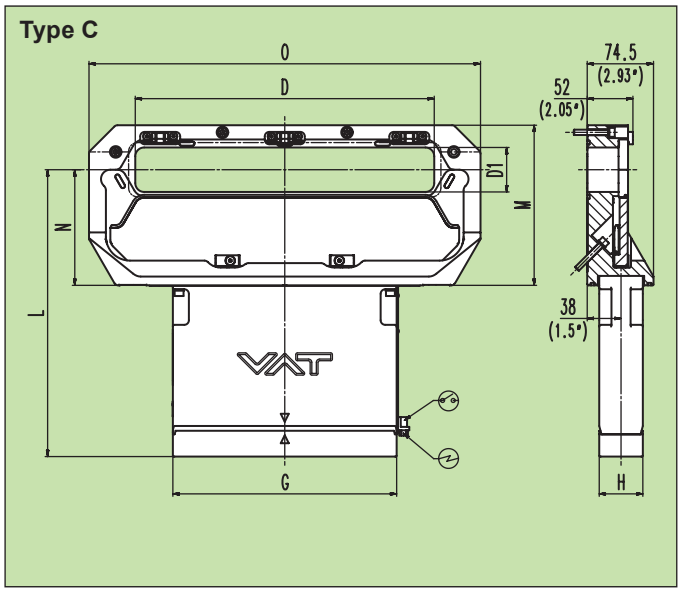

**Rear side: type A**




▼ valve seat side
✳ required for dismantling
⏀ electrical connection
⏀ position indicator

| | | | | |
|---|---|---|---|---|
| D1 x D | mm<br>inch | 32 x 222<br>1.26 x 8.74 | 46 x 236<br>1.81 x 9.29 | 50 x 336<br>1.97 x 13.23 |
| A | mm<br>inch | 50<br>1.97 | 50<br>1.97 | 60<br>2.36 |
| D | mm<br>inch | 222<br>8.74 | 236<br>9.29 | 336<br>13.23 |
| D1 | mm<br>inch | 32<br>1.26 | 46<br>1.81 | 50<br>1.97 |
| D2 | mm<br>inch | 275<br>10.83 | 305<br>12.01 | 405<br>15.94 |
| D3 | mm<br>inch | 29<br>1.14 | 36<br>1.42 | 36<br>1.42 |
| D4 | mm<br>inch | 35<br>1.38 | 44<br>1.73 | 45<br>1.77 |
| G | mm<br>inch | 203.5<br>8.01 | 251.5<br>9.9 | 251.5<br>9.9 |
| H | mm<br>inch | 43<br>1.69 | 49<br>1.93 | 49<br>1.93 |
| L | mm<br>inch | 251.5<br>9.9 | 322.5<br>12.7 | 322.5<br>12.7 |
| N | mm<br>inch | 112<br>4.41 | 119<br>4.69 | 119<br>4.69 |
| O | mm<br>inch | 340<br>13.39 | 340<br>13.39 | 440<br>17.32 |
| Q | mm<br>inch | 75<br>3.13 | 90<br>3.54 | 90<br>3.54 |

## Dimensions: Insert Series 032




⊖ electrical connection
⊖ position indicator

| | | | | |
|---|---|---|---|---|
| D1 x D | mm<br>inch | 32 x 222<br>1.26 x 8.74 | 46 x 236<br>1.81 x 9.29 | 50 x 336<br>1.97 x 13.23 |
| D | mm<br>inch | 222<br>8.74 | 236<br>9.29 | 336<br>13.23 |
| D1 | mm<br>inch | 32<br>1.26 | 46<br>1.81 | 50<br>1.97 |
| G | mm<br>inch | 203.5<br>8.01 | 251.5<br>9.9 | 251.5<br>9.9 |
| H | mm<br>inch | 43<br>1.69 | 49<br>1.93 | 49<br>1.93 |
| L | mm<br>inch | 251.5<br>9.9 | 322.5<br>12.7 | 322.5<br>12.7 |
| M | mm<br>inch | 135<br>5.31 | 175<br>6.89 | 180<br>7.09 |
| N | mm<br>inch | 100<br>3.94 | 130<br>5.12 | 130<br>5.12 |
| O | mm<br>inch | 290<br>11.42 | 320<br>12.6 | 440<br>17.32 |