

## DX – materiał ślizgowy wymagający smarowania

### 1. Struktura

Warstwa ślizgowa żywicy poliacetalowej z kieszonkami smarnymi (lub bez) na spieku brązowym, na taśmie stalowej.

### 2. Charakterystyka

- materiał ślizgowy do pracy w warunkach ograniczonego smarowania smarem o dużej odporności na zużycie,
- może być również smarowany olejem,
- przeznaczony do pracy pod dużymi obciążeniami przy małych prędkościach,
- szeroki zakres typoszeregu dostępny z magazynu,
- wykonywany w dwóch polach tolerancji **PM** oraz **MB** – z przeznaczeniem do współpracy z wałkami w tolerancji h8 lub d8,
- zachowuje się podobnie jak biały metal,
- kieszonki smarne są stałym zasobnikiem środka smarnego.

### 3. Zastosowanie

- przemysłowe: manipulatory, podnośniki, suwaki, cylindry hydrauliczne, silniki hydrauliczne, kolejki linowe dla narciarzy, osprzęt pneumatyki, sprzęt medyczny, przemysł tekstylny, rolniczy, osprzęt naukowy itd.
- motoryzacyjne: układy kierownicze, suwaki foteli, tuleje zwrotnic, tuleje pedałów, osie kłapy bagażnika, tuleje szczęk hamulcowych itd.

### 4. Dostępność

- z magazynu: tuleje cylindryczne, podkładki oporowe oraz taśmy,
- na specjalne zamówienie: wykonania niestandardowe.

### 5. Parametry techniczne

| Parametr                    |                            | Jednostka | Wartość         |
|-----------------------------|----------------------------|-----------|-----------------|
| Maksymalne obciążenia       | statyczne                  | MPa       | 140             |
|                             | dynamiczne                 |           | 70              |
| Maksymalna prędkość liniowa | ze smarem                  | m/s       | 2,5             |
| Współczynnik p x v          | ze smarem                  | MPa x m/s | 2,8             |
| Temperatura pracy           | maksymalna                 | °C        | +130            |
|                             | minimalna                  |           | -40             |
| Współczynnik tarcia         | ze smarem                  | -         | 0,06 – 0,12     |
| Gładkość Ra                 | wałka                      | µm        | 0,2 – 0,8       |
|                             | obudowy                    |           | 1,8 – 3,2       |
| Tolerancje wykonania        | wałka                      | -         | <b>PM</b><br>h8 |
|                             |                            |           | <b>MB</b><br>d8 |
|                             | obudowy                    | -         | H7              |
| Twardość wałka              | normalna                   | HB        | >200            |
|                             | dla zwiększonej żywotności |           | >350            |

### 6. Warunki pracy

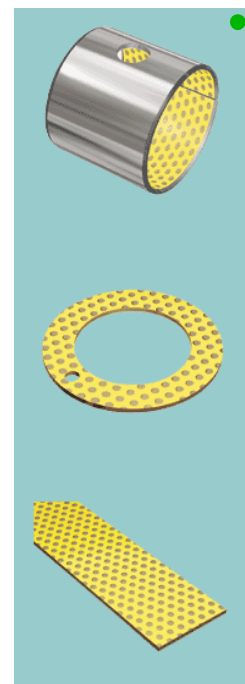
|                        |               |
|------------------------|---------------|
| na sucho               | nie zalecane  |
| w oleju                | dobrze        |
| ze smarem              | bardzo dobrze |
| w wodzie               | nie zalecane  |
| z cieczami procesowymi | nie zalecane  |

### 7. Wskazówki montażowe

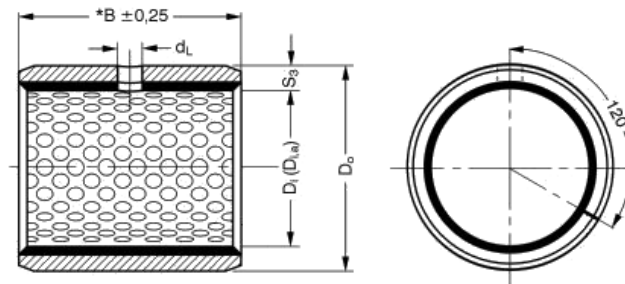
Osadzać z użyciem trzpienia stopniowanego w otworze z wykonaną fazą wciskową po uprzednim zwilżeniu tulei lub otworu olejem.

Ustalenie: poza połączeniem wciskowym nie jest wymagane żadne dodatkowe zabezpieczenie, choć w konstrukcjach specjalnych lub dla ruchu posuwisto-zwrotnego możliwe jest również klejenie (np. klejem Loctite).

Nie stosować do smarowania olejów amortyzatorowych, środków z dodatkiem MoS<sub>2</sub>, grafitu i innych dodatków stałych (mogących zwiększać zużycie na skutek tarcia).

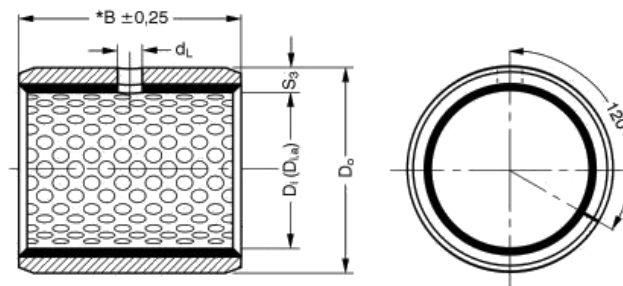


## 8. Typoszeregi


 \*  $D_i \geq 80 \text{ mm} > B \pm 0,5$ 

Tab. 1. Tuleje cylindryczne PM DX

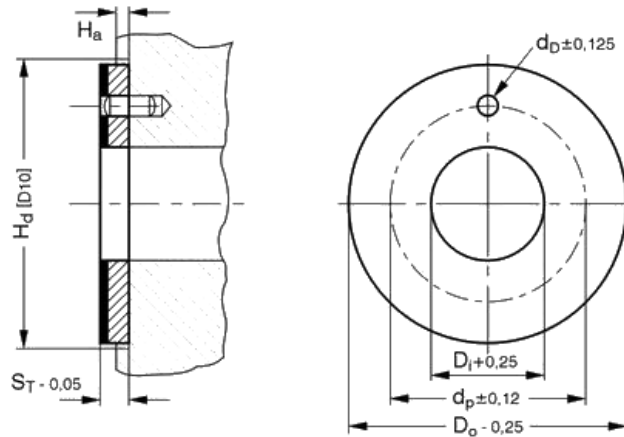
| Oznaczenie | Di | Do | B  | Oznaczenie | Di | Do | B  | Oznaczenie | Di  | Do  | B    | Oznaczenie | Di  | Do  | B   |
|------------|----|----|----|------------|----|----|----|------------|-----|-----|------|------------|-----|-----|-----|
| PM0808DX   | 8  | 10 | 8  | PM3220DX   | 32 | 36 | 20 | PM8060DX   | 80  | 85  | 60   | PM16080DX  | 160 | 165 | 80  |
| PM0810DX   | 8  | 10 | 10 | PM3230DX   | 32 | 36 | 30 | PM8080DX   | 80  | 85  | 80   | PM160100DX | 160 | 165 | 100 |
| PM0812DX   | 8  | 10 | 12 | PM3235DX   | 32 | 36 | 35 | PM80100DX  | 80  | 85  | 100  | PM17050DX  | 170 | 175 | 50  |
| PM1010DX   | 10 | 12 | 10 | PM3240DX   | 32 | 36 | 40 | PM8530DX   | 85  | 90  | 30   | PM17060DX  | 170 | 175 | 60  |
| PM1012DX   | 10 | 12 | 12 | PM3520DX   | 35 | 39 | 20 | PM8540DX   | 85  | 90  | 40   | PM17080DX  | 170 | 175 | 80  |
| PM1015DX   | 10 | 12 | 15 | PM3530DX   | 35 | 39 | 30 | PM8560DX   | 85  | 90  | 60   | PM170100DX | 170 | 175 | 100 |
| PM1020DX   | 10 | 12 | 20 | PM3535DX   | 35 | 39 | 35 | PM8580DX   | 85  | 90  | 80   | PM18050DX  | 180 | 185 | 50  |
| PM1210DX   | 12 | 14 | 10 | PM3550DX   | 35 | 39 | 50 | PM85100DX  | 85  | 90  | 100  | PM18060DX  | 180 | 185 | 60  |
| PM1212DX   | 12 | 14 | 12 | PM3635DX   | 36 | 40 | 35 | PM9040DX   | 90  | 95  | 40   | PM18080DX  | 180 | 185 | 80  |
| PM1215DX   | 12 | 14 | 15 | PM3720DX   | 37 | 41 | 20 | PM9060DX   | 90  | 95  | 60   | PM180100DX | 180 | 185 | 100 |
| PM1220DX   | 12 | 14 | 20 | PM4020DX   | 40 | 44 | 20 | PM9080DX   | 90  | 95  | 80   | PM19050DX  | 190 | 195 | 50  |
| PM1225DX   | 12 | 14 | 25 | PM4030DX   | 40 | 44 | 30 | PM9090DX   | 90  | 95  | 90   | PM19060DX  | 190 | 195 | 60  |
| PM1415DX   | 14 | 16 | 15 | PM4040DX   | 40 | 44 | 40 | PM90100DX  | 90  | 95  | 100  | PM19080DX  | 190 | 195 | 80  |
| PM1420DX   | 14 | 16 | 20 | PM4050DX   | 40 | 44 | 50 | PM9560DX   | 95  | 100 | 60   | PM190100DX | 190 | 195 | 100 |
| PM1425DX   | 14 | 16 | 25 | PM4520DX   | 45 | 50 | 20 | PM95100DX  | 95  | 100 | 100  | PM190120DX | 190 | 195 | 120 |
| PM1510DX   | 15 | 17 | 10 | PM4530DX   | 45 | 50 | 30 | PM10050DX  | 100 | 105 | 50   | PM20050DX  | 200 | 205 | 50  |
| PM1512DX   | 15 | 17 | 12 | PM4540DX   | 45 | 50 | 40 | PM10060DX  | 100 | 105 | 60   | PM20060DX  | 200 | 205 | 60  |
| PM1515DX   | 15 | 17 | 15 | PM4545DX   | 45 | 50 | 45 | PM10080DX  | 100 | 105 | 80   | PM20080DX  | 200 | 205 | 80  |
| PM1525DX   | 15 | 17 | 25 | PM4550DX   | 45 | 50 | 50 | PM10095DX  | 100 | 105 | 95   | PM200100DX | 200 | 205 | 100 |
| PM1615DX   | 16 | 18 | 15 | PM5030DX   | 50 | 55 | 30 | PM100115DX | 100 | 105 | 115  | PM200120DX | 200 | 205 | 120 |
| PM1620DX   | 16 | 18 | 20 | PM5040DX   | 50 | 55 | 40 | PM10560DX  | 105 | 110 | 60   | PM22050DX  | 220 | 225 | 50  |
| PM1625DX   | 16 | 18 | 25 | PM5045DX   | 50 | 55 | 45 | PM105110DX | 105 | 110 | 110  | PM22060DX  | 220 | 225 | 60  |
| PM1815DX   | 18 | 20 | 15 | PM5050DX   | 50 | 55 | 50 | PM105115DX | 105 | 110 | 115  | PM22080DX  | 220 | 225 | 80  |
| PM1820DX   | 18 | 20 | 20 | PM5060DX   | 50 | 55 | 60 | PM11060DX  | 110 | 115 | 60   | PM220100DX | 220 | 225 | 100 |
| PM1825DX   | 18 | 20 | 25 | PM5520DX   | 55 | 60 | 20 | PM110110DX | 110 | 115 | 110  | PM220120DX | 220 | 225 | 120 |
| PM2010DX   | 20 | 23 | 10 | PM5525DX   | 55 | 60 | 25 | PM110115DX | 110 | 115 | 115  | PM24050DX  | 240 | 245 | 50  |
| PM2015DX   | 20 | 23 | 15 | PM5530DX   | 55 | 60 | 30 | PM11550DX  | 115 | 120 | 50   | PM24060DX  | 240 | 245 | 60  |
| PM2020DX   | 20 | 23 | 20 | PM5540DX   | 55 | 60 | 40 | PM11570DX  | 115 | 120 | 70,2 | PM24080DX  | 240 | 245 | 80  |
| PM2025DX   | 20 | 23 | 25 | PM5550DX   | 55 | 60 | 50 | PM12060DX  | 120 | 125 | 60   | PM240100DX | 240 | 245 | 100 |
| PM2030DX   | 20 | 23 | 30 | PM5560DX   | 55 | 60 | 60 | PM120100DX | 120 | 125 | 100  | PM240120DX | 240 | 245 | 120 |
| PM2215DX   | 22 | 25 | 15 | PM6030DX   | 60 | 65 | 30 | PM120110DX | 120 | 125 | 110  | PM25050DX  | 250 | 255 | 50  |
| PM2220DX   | 22 | 25 | 20 | PM6040DX   | 60 | 65 | 40 | PM12560DX  | 125 | 130 | 60   | PM25060DX  | 250 | 255 | 60  |
| PM2225DX   | 22 | 25 | 25 | PM6050DX   | 60 | 65 | 50 | PM125100DX | 125 | 130 | 100  | PM25080DX  | 250 | 255 | 80  |
| PM2230DX   | 22 | 25 | 30 | PM6060DX   | 60 | 65 | 60 | PM125110DX | 125 | 130 | 110  | PM250100DX | 250 | 255 | 100 |
| PM2415DX   | 24 | 27 | 15 | PM6070DX   | 60 | 65 | 70 | PM13050DX  | 130 | 135 | 50   | PM250120DX | 250 | 255 | 120 |
| PM2420DX   | 24 | 27 | 20 | PM6540DX   | 65 | 70 | 40 | PM13060DX  | 130 | 135 | 60   | PM26050DX  | 260 | 265 | 50  |
| PM2425DX   | 24 | 27 | 25 | PM6550DX   | 65 | 70 | 50 | PM13080DX  | 130 | 135 | 80   | PM26060DX  | 260 | 265 | 60  |
| PM2430DX   | 24 | 27 | 30 | PM6560DX   | 65 | 70 | 60 | PM130100DX | 130 | 135 | 100  | PM26080DX  | 260 | 265 | 80  |
| PM2515DX   | 25 | 28 | 15 | PM6570DX   | 65 | 70 | 70 | PM13560DX  | 135 | 140 | 60   | PM260100DX | 260 | 265 | 100 |
| PM2520DX   | 25 | 28 | 20 | PM7040DX   | 70 | 75 | 40 | PM13580DX  | 135 | 140 | 80   | PM260120DX | 260 | 265 | 120 |
| PM2525DX   | 25 | 28 | 25 | PM7050DX   | 70 | 75 | 50 | PM14050DX  | 140 | 145 | 50   | PM28050DX  | 280 | 285 | 50  |
| PM2530DX   | 25 | 28 | 30 | PM7060DX   | 70 | 75 | 60 | PM14060DX  | 140 | 145 | 60   | PM28060DX  | 280 | 285 | 60  |
| PM283130DX | 28 | 31 | 30 | PM7065DX   | 70 | 75 | 65 | PM14080DX  | 140 | 145 | 80   | PM28080DX  | 280 | 285 | 80  |
| PM2820DX   | 28 | 32 | 20 | PM7070DX   | 70 | 75 | 70 | PM140100DX | 140 | 145 | 100  | PM280100DX | 280 | 285 | 100 |
| PM2825DX   | 28 | 32 | 25 | PM7080DX   | 70 | 75 | 80 | PM15050DX  | 150 | 155 | 50   | PM280120DX | 280 | 285 | 120 |
| PM2830DX   | 28 | 32 | 30 | PM7540DX   | 75 | 80 | 40 | PM15060DX  | 150 | 155 | 60   | PM30050DX  | 300 | 305 | 50  |
| PM3020DX   | 30 | 34 | 20 | PM7560DX   | 75 | 80 | 60 | PM15080DX  | 150 | 155 | 80   | PM30060DX  | 300 | 305 | 60  |
| PM3025DX   | 30 | 34 | 25 | PM7580DX   | 75 | 80 | 80 | PM150100DX | 150 | 155 | 100  | PM30080DX  | 300 | 305 | 80  |
| PM3030DX   | 30 | 34 | 30 | PM8040DX   | 80 | 85 | 40 | PM16050DX  | 160 | 165 | 50   | PM300100DX | 300 | 305 | 100 |
| PM3040DX   | 30 | 34 | 40 | PM8050DX   | 80 | 85 | 50 | PM16060DX  | 160 | 165 | 60   | PM300120DX | 300 | 305 | 120 |



\*  $D_i \geq 80 \text{ mm} > B \pm 0,5$

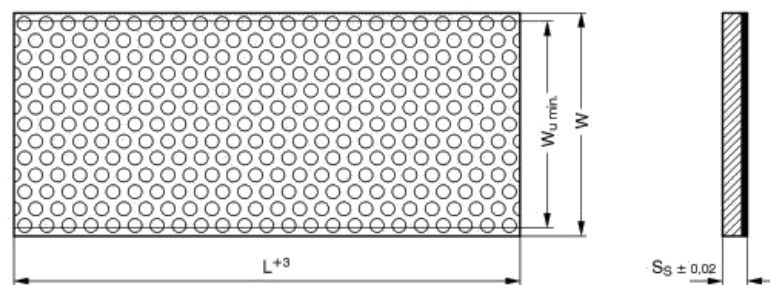
Tab. 2. Tuleje cylindryczne MB DX

| Oznaczenie | Di | Do | B  | Oznaczenie | Di | Do | B  | Oznaczenie | Di  | Do  | B   | Oznaczenie | Di  | Do  | B    |
|------------|----|----|----|------------|----|----|----|------------|-----|-----|-----|------------|-----|-----|------|
| MB0808DX   | 8  | 10 | 8  | MB2425DX   | 24 | 27 | 25 | MB5560DX   | 55  | 60  | 60  | MB100115DX | 100 | 105 | 115  |
| MB0810DX   | 8  | 10 | 10 | MB2430DX   | 24 | 27 | 30 | MB6030DX   | 60  | 65  | 30  | MB10560DX  | 105 | 110 | 60   |
| MB0812DX   | 8  | 10 | 12 | MB2515DX   | 25 | 28 | 15 | MB6040DX   | 60  | 65  | 40  | MB105110DX | 105 | 110 | 110  |
| MB1010DX   | 10 | 12 | 10 | MB2520DX   | 25 | 28 | 20 | MB6060DX   | 60  | 65  | 60  | MB105115DX | 105 | 110 | 115  |
| MB1012DX   | 10 | 12 | 12 | MB2525DX   | 25 | 28 | 25 | MB6070DX   | 60  | 65  | 70  | MB11060DX  | 110 | 115 | 60   |
| MB1015DX   | 10 | 12 | 15 | MB2530DX   | 25 | 28 | 30 | MB6540DX   | 65  | 70  | 40  | MB110115DX | 110 | 115 | 115  |
| MB1020DX   | 10 | 12 | 20 | MB2820DX   | 28 | 32 | 20 | MB6550DX   | 65  | 70  | 50  | MB11550DX  | 115 | 120 | 50   |
| MB1210DX   | 12 | 14 | 10 | MB2825DX   | 28 | 32 | 25 | MB6560DX   | 65  | 70  | 60  | MB11570DX  | 115 | 120 | 70,2 |
| MB1212DX   | 12 | 14 | 12 | MB2830DX   | 28 | 32 | 30 | MB6570DX   | 65  | 70  | 70  | MB12060DX  | 120 | 125 | 60   |
| MB1215DX   | 12 | 14 | 15 | MB3020DX   | 30 | 34 | 20 | MB7040DX   | 70  | 75  | 40  | MB120100DX | 120 | 125 | 100  |
| MB1220DX   | 12 | 14 | 20 | MB3030DX   | 30 | 34 | 30 | MB7050DX   | 70  | 75  | 50  | MB125100DX | 125 | 130 | 100  |
| MB1225DX   | 12 | 14 | 25 | MB3040DX   | 30 | 34 | 40 | MB7065DX   | 70  | 75  | 65  | MB13050DX  | 130 | 135 | 50   |
| MB1415DX   | 14 | 16 | 15 | MB3220DX   | 32 | 36 | 20 | MB7070DX   | 70  | 75  | 70  | MB13060DX  | 130 | 135 | 60   |
| MB1420DX   | 14 | 16 | 20 | MB3230DX   | 32 | 36 | 30 | MB7080DX   | 70  | 75  | 80  | MB130100DX | 130 | 135 | 100  |
| MB1425DX   | 14 | 16 | 25 | MB3235DX   | 32 | 36 | 35 | MB7540DX   | 75  | 80  | 40  | MB13560DX  | 135 | 140 | 60   |
| MB1510DX   | 15 | 17 | 10 | MB3240DX   | 32 | 36 | 40 | MB7560DX   | 75  | 80  | 60  | MB13580DX  | 135 | 140 | 80   |
| MB1512DX   | 15 | 17 | 12 | MB3520DX   | 35 | 39 | 20 | MB7580DX   | 75  | 80  | 80  | MB14060DX  | 140 | 145 | 60   |
| MB1515DX   | 15 | 17 | 15 | MB3530DX   | 35 | 39 | 30 | MB8040DX   | 80  | 85  | 40  | MB140100DX | 140 | 145 | 100  |
| MB1525DX   | 15 | 17 | 25 | MB3550DX   | 35 | 39 | 50 | MB8060DX   | 80  | 85  | 60  | MB15060DX  | 150 | 155 | 60   |
| MB1615DX   | 16 | 18 | 15 | MB3720DX   | 37 | 41 | 20 | MB8080DX   | 80  | 85  | 80  | MB15080DX  | 150 | 155 | 80   |
| MB1620DX   | 16 | 18 | 20 | MB4020DX   | 40 | 44 | 20 | MB80100DX  | 80  | 85  | 100 | MB150100DX | 150 | 155 | 100  |
| MB1625DX   | 16 | 18 | 25 | MB4030DX   | 40 | 44 | 30 | MB8530DX   | 85  | 90  | 30  |            |     |     |      |
| MB1815DX   | 18 | 20 | 15 | MB4040DX   | 40 | 44 | 40 | MB8540DX   | 85  | 90  | 40  |            |     |     |      |
| MB1820DX   | 18 | 20 | 20 | MB4050DX   | 40 | 44 | 50 | MB8560DX   | 85  | 90  | 60  |            |     |     |      |
| MB1825DX   | 18 | 20 | 25 | MB4520DX   | 45 | 50 | 20 | MB8580DX   | 85  | 90  | 80  |            |     |     |      |
| MB2010DX   | 20 | 23 | 10 | MB4530DX   | 45 | 50 | 30 | MB85100DX  | 85  | 90  | 100 |            |     |     |      |
| MB2015DX   | 20 | 23 | 15 | MB4540DX   | 45 | 50 | 40 | MB9040DX   | 90  | 95  | 40  |            |     |     |      |
| MB2020DX   | 20 | 23 | 20 | MB4545DX   | 45 | 50 | 45 | MB9060DX   | 90  | 95  | 60  |            |     |     |      |
| MB2025DX   | 20 | 23 | 25 | MB4550DX   | 45 | 50 | 50 | MB9090DX   | 90  | 95  | 90  |            |     |     |      |
| MB2030DX   | 20 | 23 | 30 | MB5040DX   | 50 | 55 | 40 | MB90100DX  | 90  | 95  | 100 |            |     |     |      |
| MB2215DX   | 22 | 25 | 15 | MB5060DX   | 50 | 55 | 60 | MB9560DX   | 95  | 100 | 60  |            |     |     |      |
| MB2220DX   | 22 | 25 | 20 | MB5520DX   | 55 | 60 | 20 | MB95100DX  | 95  | 100 | 100 |            |     |     |      |
| MB2225DX   | 22 | 25 | 25 | MB5525DX   | 55 | 60 | 25 | MB10050DX  | 100 | 105 | 50  |            |     |     |      |
| MB2230DX   | 22 | 25 | 30 | MB5530DX   | 55 | 60 | 30 | MB10060DX  | 100 | 105 | 60  |            |     |     |      |
| MB2415DX   | 24 | 27 | 15 | MB5540DX   | 55 | 60 | 40 | MB10080DX  | 100 | 105 | 80  |            |     |     |      |
| MB2420DX   | 24 | 27 | 20 | MB5550DX   | 55 | 60 | 50 | MB10095DX  | 100 | 105 | 95  |            |     |     |      |



Tab. 3. Podkładki oporowe

| Oznaczenie    | Di | Do | ST   | dD   | Dp | Ha       |
|---------------|----|----|------|------|----|----------|
| <b>WC08DX</b> | 10 | 20 | 1,58 |      |    | 0,95-1,2 |
| <b>WC10DX</b> | 12 | 24 | 1,58 | 1,75 | 18 | 0,95-1,2 |
| <b>WC12DX</b> | 14 | 26 | 1,58 | 2,25 | 20 | 0,95-1,2 |
| <b>WC14DX</b> | 16 | 30 | 1,58 | 2,25 | 22 | 0,95-1,2 |
| <b>WC16DX</b> | 18 | 32 | 1,58 | 2,25 | 25 | 0,95-1,2 |
| <b>WC18DX</b> | 20 | 36 | 1,58 | 3,25 | 28 | 0,95-1,2 |
| <b>WC20DX</b> | 22 | 38 | 1,58 | 3,25 | 30 | 0,95-1,2 |
| <b>WC22DX</b> | 24 | 42 | 1,58 | 3,25 | 33 | 0,95-1,2 |
| <b>WC24DX</b> | 26 | 44 | 1,58 | 3,25 | 35 | 0,95-1,2 |
| <b>WC25DX</b> | 28 | 48 | 1,58 | 4,25 | 38 | 0,95-1,2 |
| <b>WC30DX</b> | 32 | 54 | 1,58 | 4,25 | 43 | 0,95-1,2 |
| <b>WC35DX</b> | 38 | 62 | 1,58 | 4,25 | 50 | 0,95-1,2 |
| <b>WC40DX</b> | 42 | 66 | 1,58 | 4,25 | 54 | 0,95-1,2 |
| <b>WC45DX</b> | 48 | 74 | 2,6  | 4,25 | 61 | 1,45-1,7 |
| <b>WC50DX</b> | 52 | 78 | 2,6  | 4,25 | 65 | 1,45-1,7 |



Tab. 4. Płyty

| Oznaczenie      | L   | W   | Wu  | Ss   |
|-----------------|-----|-----|-----|------|
| <b>S10080DX</b> | 500 | 92  | 80  | 1,05 |
| <b>S10150DX</b> | 500 | 160 | 150 | 1,05 |
| <b>S15190DX</b> | 500 | 200 | 190 | 1,54 |
| <b>S20190DX</b> | 500 | 200 | 190 | 2,03 |
| <b>S25190DX</b> | 500 | 200 | 190 | 2,55 |