

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 klapy 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 | - | PM h8 |
| | | | MB d8 |
| | obudowy | - | H7 |
| Twardość wałka | normalna | HB | >200 |
| | dla zwiększonej żywotności | | >350 |

6. Warunki pracy

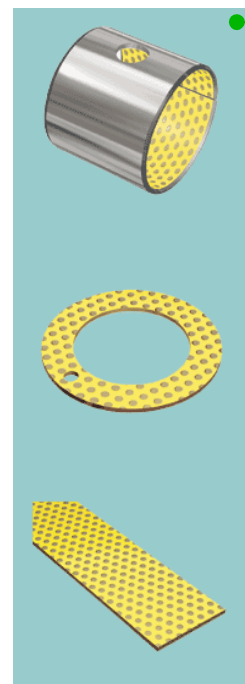
| | |
|------------------------|---------------|
| na sucho | nie zalecane |
| w oleju | dobrze |
| ze smarem | bardzo dobrze |
| w wodzie | nie zalecane |
| z cieczami procesowymi | nie zalecane |

7. Wskazówki montażowe

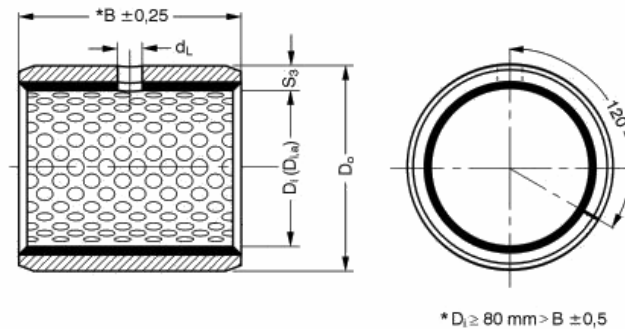
Osadzać z użyciem trzpienia stopniowanego w otworze z wykonaną fazą wciskową po uprzednim zwilżeniu tulei lub otworu olejem.

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 MoS₂, grafitu i innych dodatków stałych (mogących zwiększać zużycie na skutek tarcia).

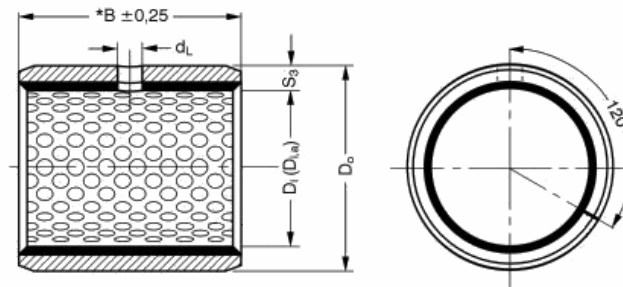


8. Typoszeregi



Tab. 1. Tuleje cylindryczne PM DX

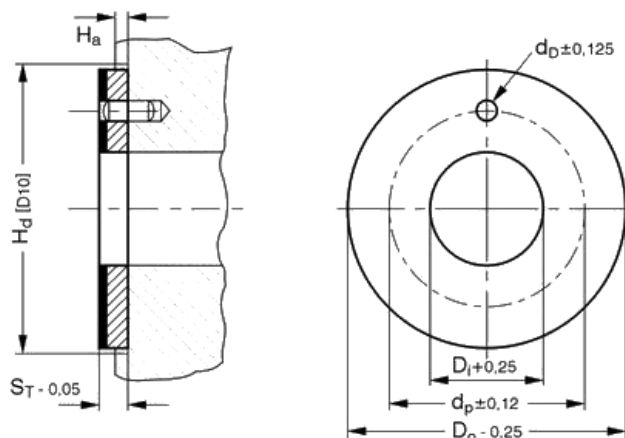
| Oznaczenie | Di | Do | B | Oznaczenie | Di | Do | B | Oznaczenie | Di | Do | B | Oznaczenie | Di | Do | B |
|------------|----|----|----|------------|----|----|----|------------|-----|-----|------|------------|-----|-----|-----|
| PM0808DX | 8 | 10 | 8 | PM3220DX | 32 | 36 | 20 | PM8060DX | 80 | 85 | 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 |



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

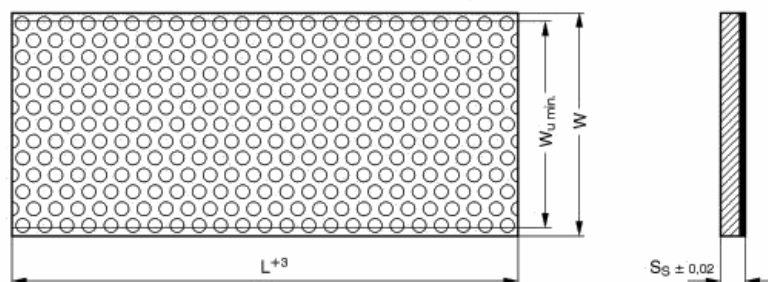
Tab. 2. Tuleje cylindryczne MB DX

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



Tab. 4. Płyty

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