

DELTA THREE OSCAR Virginia Tech Corporate Research Center 2270 Kraft Drive Suite 1260, Blacksburg VA 24060, USA

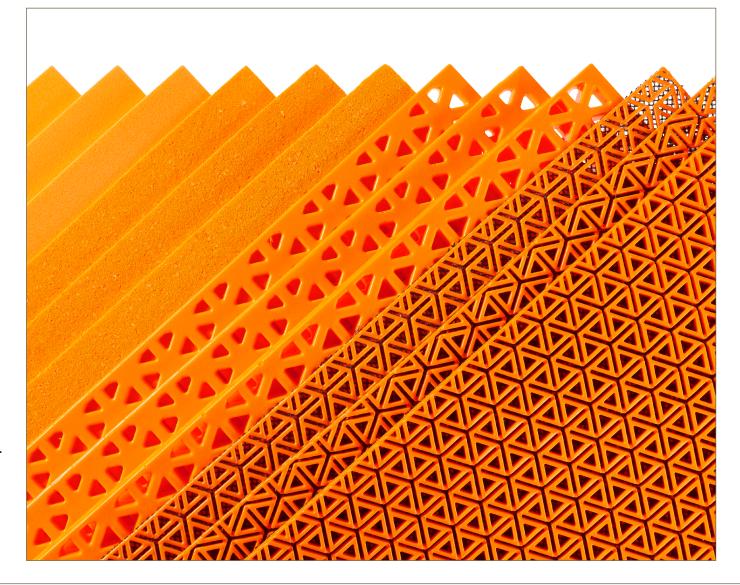
# SHEET MATERIALS

Delta Three Oscar<sup>™</sup> has various sheet material options designed for simple integration into your product range:

- Fastest route to market with a Delta Three Oscar<sup>™</sup> solution, no development required
- Easy to post-process and integrate within finished product
- High-impact performing, low profile, flexible solutions
- 4 different sheet constructions
- 8 different material formulations

No matter the application, Delta Three Oscar<sup>™</sup> has sheet options to help take your product to the next level.

Delta Three Oscar<sup>™</sup> uses rate sensitive, soft and flexible D3O<sup>®</sup> materials for shock absorption and impact protection applications.



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## **STEP 1: PICK THE TYPE OF SHEET**

| SOLID SHEET<br>(SKINNED) |  |
|--------------------------|--|

|               | DURABILITY  |                        | DURABILITY  |
|---------------|-------------|------------------------|-------------|
|               |             |                        |             |
|               | TOLERANCES  |                        | TOLERANCES  |
|               |             | Maria - Longer         |             |
|               | VENTILATION |                        | VENTILATION |
|               |             |                        |             |
|               | FLEXIBILITY |                        | FLEXIBILITY |
|               |             |                        |             |
|               |             |                        | LIGHTWEIGHT |
| SOLID SHEET   |             | SKIVED SHEET           |             |
| (SKINNED)     | CUSHIONING  |                        | CUSHIONING  |
|               |             |                        |             |
|               |             |                        |             |
|               | DURABILITY  |                        | DURABILITY  |
|               |             |                        |             |
|               | TOLERANCES  |                        | TOLERANCES  |
|               |             |                        |             |
|               | VENTILATION |                        | VENTILATION |
|               |             |                        |             |
|               | FLEXIBILITY |                        | FLEXIBILITY |
|               |             |                        |             |
|               |             |                        | LIGHTWEIGHT |
| TRIVENT SHEET |             | IMPACT PRINT™<br>SHEET |             |
|               | CUSHIONING  |                        |             |
|               |             |                        |             |

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# **STEP 2: PICK THE D30<sup>®</sup> FORMULATION**

HIGH DENSITY HIGH IMPACTS

| Formulati                      | on  | Impact type    | Density<br>(4mm) | Hardness<br>(4mm) | Temperature<br>stability | Material Type    |
|--------------------------------|-----|----------------|------------------|-------------------|--------------------------|------------------|
| Impact Print                   | ţтм | High energy    | 1.13             | 55 (Shore A)      | Great (geometry)         | Set Elastomer    |
| ХТі                            |     | High energy    | 0.52             | 76 (Shore 00)     | Good                     |                  |
| ST                             |     | High energy    | 0.48             | 76 (Shore 00)     | Low                      |                  |
| DECELL                         |     | Low-mid energy | 0.39             | 70 (Shore 00)     | Good                     |                  |
| AERO                           |     | Low-mid energy | 0.37             | 58 (Shore 00)     | Average                  | Set Foams        |
| AEROMAX                        | (   | Low-mid energy | 0.23             | 40 (Shore 00)     | Average                  |                  |
| US Decell TRU<br>(Berry Compli |     | Low-mid energy | 0.22             | 58 (Shore 00)     | Good                     |                  |
| ZERO Mid                       | I   | Low energy     | 0.29             | 60 (Shore 00)     | Great                    | Decivoled Fearre |
| ZERO Low                       | /   | Low energy     | 0.24             | 49 (Shore 00)     | Great                    | Recycled Foams   |

\*US Decell TRUST: density and hardness data based on 5mm sheet

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LOW DENSITY LOW IMPACTS

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## **STEP 3: PICK THE DIMENSIONS**

HIGH DENSITY HIGH IMPACTS

| Formulation                          | <b>Solid</b><br>369 x 255mm | <b>Skived</b><br>337 x 305mm | <b>Skived</b><br>1000 x 1000mm | <b>TriVent</b><br>490 x 290mm | Impact Print™<br>500 x 500mm |
|--------------------------------------|-----------------------------|------------------------------|--------------------------------|-------------------------------|------------------------------|
| Impact Print™                        |                             |                              |                                |                               | 2, 4, 6mm                    |
| ХТі                                  | 4, 6, 10mm                  |                              |                                | 4, 6, 10mm                    |                              |
| ST                                   | 4, 6, 10mm                  |                              |                                | 4, 6, 10mm                    |                              |
| DECELL                               | 4, 6mm                      |                              |                                |                               |                              |
| AERO                                 | 4, 6mm                      |                              |                                | 4, 6mm                        |                              |
| AEROMAX                              |                             |                              | 2, 4, 6, 8, 10mm               |                               |                              |
| US Decell TRUST<br>(Berry-Compliant) |                             | 2, 4, 6, 10mm                |                                |                               |                              |
| ZERO Low/Mid                         |                             |                              | 2, 4, 6, 8, 10mm               |                               |                              |

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LOW DENSITY LOW IMPACTS

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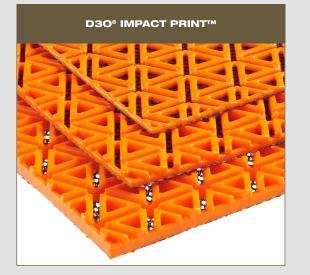


D30<sup>®</sup> Impact Print<sup>™</sup>, Comparative Impact Test (10 J)

iP sheet delivers the most flexible, durable protection on the market. Its open geometry combined with mesh fabric provides complete freedom of movement, increased air flow and breathability.

**D30<sup>®</sup> IMPACT** 

**PRINT™** (iP)



Transmitted Force (kN) 30 20 10 Peak <sup>.</sup> 0 Thickness (mm) -10 -20 -30 6mm D30 4mm D3O 6mm VN 7mm HPE 2mm D3O 20mm PE / EVA 10mm VN 10mm EVA 10mm LDPE iP Mesh iP Mesh iP Mesh Foam Foam

| Material        | D3O <sup>®</sup> Impact Print™ |                  |                  |  |  |  |
|-----------------|--------------------------------|------------------|------------------|--|--|--|
| Product Name    | iP™ Mesh 2mm                   | iP™ Mesh 4mm     | iP™ Mesh 6mm     |  |  |  |
| Product Code    | 14205                          | 14055            | 14056            |  |  |  |
| Colour          | Orange                         | Orange           | Orange           |  |  |  |
| Dimensions (mm) | 500 × 500                      | 500 × 500        | 500 x 500        |  |  |  |
| Thickness (mm)  | 2                              | 4                | 6                |  |  |  |
| Weight (g)      | 301                            | 613              | 911              |  |  |  |
| Material Code   | SE006                          | SE006            | SE006            |  |  |  |
| Material Type   | Set<br>Elastomer               | Set<br>Elastomer | Set<br>Elastomer |  |  |  |
| Fabric          | Mesh                           | Mesh             | Mesh             |  |  |  |

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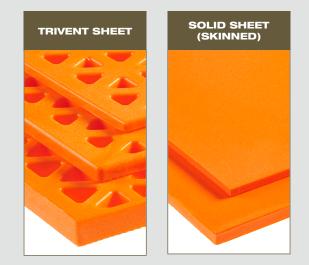


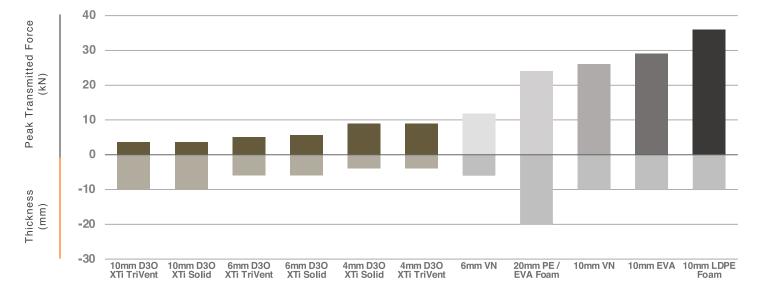
D30<sup>®</sup> XTi



D30<sup>®</sup> XTi, Comparative Impact Test (10 J)

Optimised for high impact energies, XTi provides soft, flexible and lightweight impact protection frequently used for limb protectors in motorcycle and sport.





| Material        |                     |                     |                      |                       |                       |                        |
|-----------------|---------------------|---------------------|----------------------|-----------------------|-----------------------|------------------------|
| Product Name    | XTi Solid 4mm Sheet | XTi Solid 6mm Sheet | XTi Solid 10mm Sheet | XTi TriVent 4mm Sheet | XTi TriVent 6mm Sheet | XTi TriVent 10mm Sheet |
| Product Code    | 11081               | 11082               | 14260                | 14047                 | 14048                 | 14050                  |
| Colour          | Orange              | Orange              | Orange               | Orange                | Orange                | Orange                 |
| Dimensions (mm) | 369 x 255           | 369 x 255           | 369 x 255            | 490 x 290             | 490 x 290             | 490 x 290              |
| Thickness (mm)  | 4                   | 6                   | 10                   | 4                     | 6                     | 10                     |
| Weight (g)      | 196                 | 294                 | 490                  | 279                   | 385                   | 583                    |
| Material Code   | SF005               | SF005               | SF005                | SF005                 | SF005                 | SF005                  |
| Material Type   | Set Foam            | Set Foam            | Set Foam             | Set Foam              | Set Foam              | Set Foam               |

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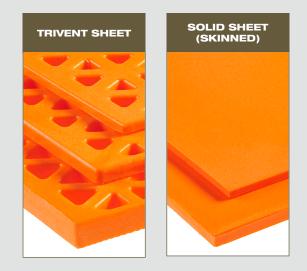


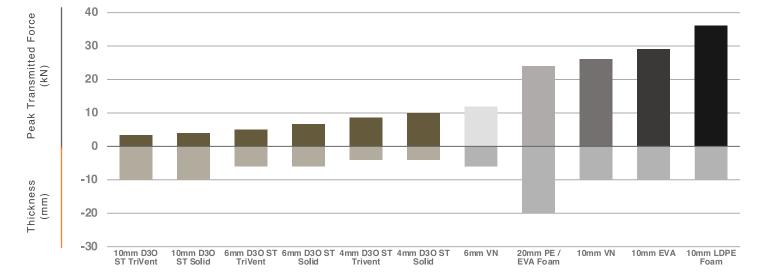
**D30<sup>®</sup> ST** 



D30<sup>®</sup> ST, Comparative Impact Test (10 J)

Designed for markets where high impact energies are experienced, ST is a soft, flexible and versatile material frequently used within limb, back and chest protectors.





| Material        |                    |                    |                     |                      |                      |                       |
|-----------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Product Name    | ST Solid 4mm Sheet | ST Solid 6mm Sheet | ST Solid 10mm Sheet | ST TriVent 4mm Sheet | ST TriVent 6mm Sheet | ST TriVent 10mm Sheet |
| Product Code    | 10620              | 10983              | 14259               | 14208                | 14209                | 14210                 |
| Colour          | Orange             | Orange             | Orange              | Orange               | Orange               | Orange                |
| Dimensions (mm) | 369 x 255          | 369 x 255          | 369 x 255           | 490 x 290            | 490 x 290            | 490 x 290             |
| Thickness (mm)  | 4                  | 6                  | 10                  | 4                    | 6                    | 10                    |
| Weight (g)      | 188                | 282                | 470                 | 234                  | 319                  | 477                   |
| Material Code   | SF001              | SF001              | SF001               | SF001                | SF001                | SF001                 |
| Material Type   | Set Foam           | Set Foam           | Set Foam            | Set Foam             | Set Foam             | Set Foam              |

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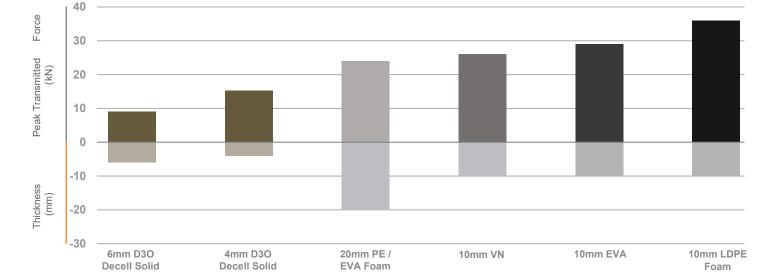
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Decell is the material of choice for insoles and heel inserts, as it offers maximum protection whilst providing a softer, lighter ride. Optimised for moderate to high impact energies, it is designed for markets where high durability is key.





| Material        | D30° Decell            |                        |  |  |  |
|-----------------|------------------------|------------------------|--|--|--|
| Product Name    | Decell Solid 4mm Sheet | Decell Solid 6mm Sheet |  |  |  |
| Product Code    | 11350                  | 11217                  |  |  |  |
| Colour          | Orange                 | Orange                 |  |  |  |
| Dimensions (mm) | 369 x 255              | 369 x 255              |  |  |  |
| Thickness (mm)  | 4                      | 6                      |  |  |  |
| Weight (g)      | 147                    | 209                    |  |  |  |
| Material Code   | SF007                  | SF007                  |  |  |  |
| Material Type   | Set Foam               | Set Foam               |  |  |  |

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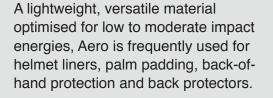


D30<sup>®</sup> Decell, Comparative Impact Test (10 J)

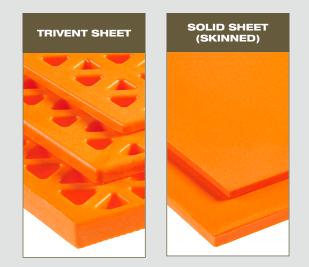


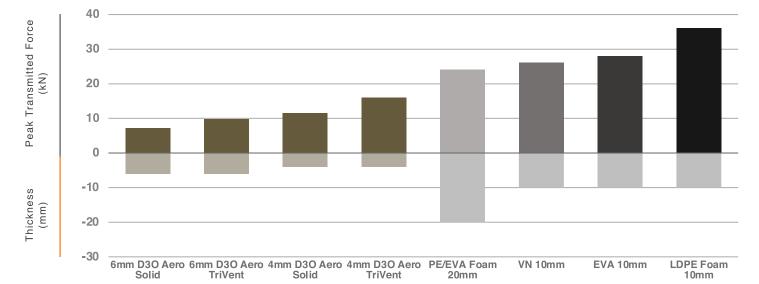


D30<sup>®</sup> Aero, Comparative Impact Test (10 J)



**D30<sup>®</sup> AERO** 





| Material        | D30 <sup>®</sup> Aero |                      |                        |                        |  |  |  |  |
|-----------------|-----------------------|----------------------|------------------------|------------------------|--|--|--|--|
| Product Name    | Aero Solid 4mm Sheet  | Aero Solid 6mm Sheet | Aero TriVent 4mm Sheet | Aero TriVent 6mm Sheet |  |  |  |  |
| Product Code    | 11191                 | 11192                | 14206                  | 14207                  |  |  |  |  |
| Colour          | Orange                | Orange               | Orange                 | Orange                 |  |  |  |  |
| Dimensions (mm) | 369 x 255             | 369 x 255            | 490 x 290              | 490 × 290              |  |  |  |  |
| Thickness (mm)  | 4                     | 6                    | 4                      | 6                      |  |  |  |  |
| Weight (g)      | 139                   | 186                  | 157                    | 199                    |  |  |  |  |
| Material Code   | SF010                 | SF010                | SF010                  | SF010                  |  |  |  |  |
| Material Type   | Set Foam              | Set Foam             | Set Foam               | Set Foam               |  |  |  |  |

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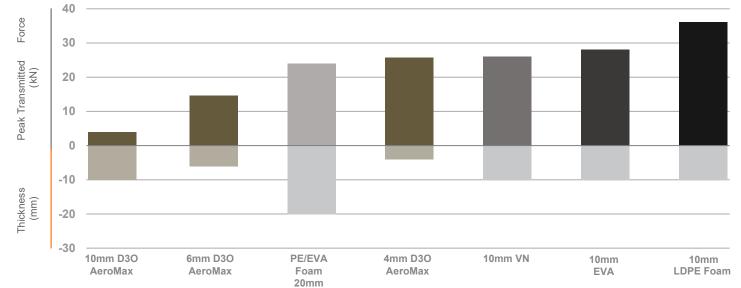
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## **D30<sup>®</sup> AEROMAX**

AeroMax takes similar performance properties of Aero and makes it available in larger sheets.





| Material        |                          |                          |                          |                          |                           |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| Product Name    | AeroMax Skived Sheet 2mm | AeroMax Skived Sheet 4mm | AeroMax Skived Sheet 6mm | AeroMax Skived Sheet 8mm | AeroMax Skived Sheet 10mm |
| Product Code    | 13440                    | 13441                    | 13657                    | 14195                    | 13591                     |
| Colour          | Orange                   | Orange                   | Orange                   | Orange                   | Orange                    |
| Dimensions (mm) | 1000 × 1000              | 1000 × 1000              | 1000 × 1000              | 1000 × 1000              | 1000 x 1000               |
| Thickness (mm)  | 2                        | 4                        | 6                        | 8                        | 10                        |
| Weight (g)      | 442                      | 884                      | 1326                     | 1808                     | 2210                      |
| Material Code   | SF028                    | SF028                    | SF028                    | SF028                    | SF028                     |
| Material Type   | Set Foam                  |

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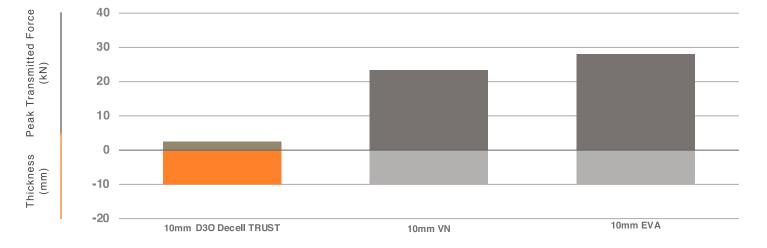
#### D30<sup>®</sup> AeroMax, Comparative Impact Test (10 J)





### D30<sup>®</sup> US DECELL TRUST

Highly suitable for padding and cushioning, Berry Compliant US Decell TRUST was designed to be die cut to service multiple end uses including limb protection applications, helmets, and others.



#### **D30° US DECELL TRUST SHEET**

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| Material        | D30 <sup>®</sup> US Decell TRUST                |   |   |  |  |  |  |  |
|-----------------|---|---|---|--|--|--|--|--|
| Product Name    | US Decell TRUST Skived 2mm Sheet<br>- 305x337mm | US Decell TRUST Skived 4mm Sheet<br>- 305x337mm | US Decell TRUST Skived 6mm Sheet<br>- 305x337mm | US Decell TRUST Skived 10mm<br>Sheet - 305x337mm |  |  |  |  |
| Product Code    | 13251   | 14261   | 14608   | 13252  |  |  |  |  |
| Dimensions (mm) | 305 x 337                                       | 305 x 337                                       | 305 x 337                                       | 305 x 337  |  |  |  |  |
| Thickness (mm)  | 2   | 4   | 6   | 10   |  |  |  |  |
| Weight (g)      | 45  | 90  | 135   | 225  |  |  |  |  |
| Material Code   | SF019   | SF019   | SF019   | SF019  |  |  |  |  |
| Material Type   | Set Foam  | Set Foam  | Set Foam  | Set Foam   |  |  |  |  |

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D30<sup>®</sup> US Decell TRUST, Comparative Impact Test (10 J)

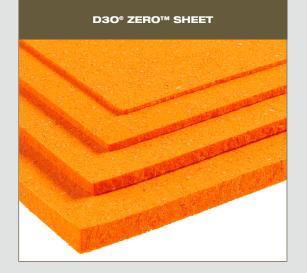




D3O<sup>®</sup> Zero<sup>™</sup>, Comparative Impact Test (10 J)

Created by recycling surplus material from D3O factories, D3O<sup>®</sup> Zero<sup>™</sup> is the first recycled grade D3O<sup>®</sup> impact protective material, offering maximum impact protection, while working towards zero waste.

**D30<sup>®</sup> ZERO**<sup>™</sup>



40 Force 30 Peak Transmitted (kN) 20 10 0 Thickness (mm) -10 -20 10mm VN Recycled Foam 10mm EVA 10mm LDPE 10mm D3O 10mm D3O Recycled Foam Recycled Foam Recycled Foam 6mm D3O 6mm D3O Zero Mid Zero Mid Zero Low Zero Low Competitor 4 Competitor 3 Competitor 2 Competitor 1 Foam

| Material               | D30º Zero™                      |                                 |                                 |                                 |                                  |                                 |                                 |                                 |                                 |                                  |
|------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|
| Product Name           | Zero Low<br>Skived 2mm<br>Sheet | Zero Low<br>Skived 4mm<br>Sheet | Zero Low<br>Skived 6mm<br>Sheet | Zero Low<br>Skived 8mm<br>Sheet | Zero Low<br>Skived 10mm<br>Sheet | Zero Mid<br>Skived 2mm<br>Sheet | Zero Mid<br>Skived 4mm<br>Sheet | Zero Mid<br>Skived 6mm<br>Sheet | Zero Mid<br>Skived 8mm<br>Sheet | Zero Mid<br>Skived 10mm<br>Sheet |
| Product Code           | 13486                           | 13488                           | 13619                           | 14200                           | 13490                            | 13487                           | 13489                           | 13618                           | 14199                           | 13491                            |
| Material Code          | Orange                          | Orange                          | Orange                          | Orange                          | Orange                           | Orange                          | Orange                          | Orange                          | Orange                          | Orange                           |
| Dimensions (mm)        | 1000 x 1000                      | 1000 x 1000                     | 1000 x 1000                     | 1000 x 1000                     | 1000 x 1000                     | 1000 x 1000                      |
| Thickness (mm)         | 2                               | 4                               | 6                               | 8                               | 10                               | 2                               | 4                               | 6                               | 8                               | 10                               |
| Weight (g)             | 460                             | 920                             | 1380                            | 1840                            | 2300                             | 540                             | 1080                            | 1620                            | 2160                            | 2700                             |
| Hardness (Shore<br>00) | Low                             | Low                             | Low                             | Low                             | Low                              | Mid                             | Mid                             | Mid                             | Mid                             | Mid                              |
| Density (g/cm3)        | RF001                           | RF001                           | RF001                           | RF001                           | RF001                            | RF001                           | RF001                           | RF001                           | RF001                           | RF001                            |

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