

## UHMW-PE AND HD-PE SLIDING PLATES, FENDERS AND OCEAN PILES

Sliding plates, fenders and ocean piles made from Polyethylene are used in many applications in the marine industry. Because of a combination of excellent impact strength with high abrasion and wear resistance as well as low friction coefficient, Polyethylene products are the state-of-the-art product for covering steel panels, piles, pontoons and other marine structures subject to heavy impacts. Polyethylene for marine applications will be compounded to withstand ozone and UV-radiation. The material does not rot and can be easily recycled at the end of the life-cycle.

### UHMW-PE Sliding Plates and Fenders

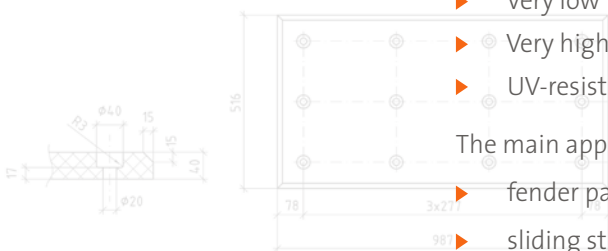
UHMW-PE Sliding Plates and Fenders are produced by a sintering process either from virgin or from reclaimed material (approx. 70% reclaimed +30% virgin material - also named double-sintered or blended UHMW-PE). More than 90% of all fender applications world-wide are using the reclaimed material. Due to its superior physical and mechanical properties, UHMW-PE (UltraHighMolecularWeight-PolyEthylene) combines highest strength with wear resistance and consequently provides the best durability of all available Polyethylene products.

The main advantages compared with other materials are:

- ▶ Very high impact strength
- ▶ Very low friction coefficient
- ▶ Very high abrasion resistance
- ▶ UV-resistant
- ▶ Ozone resistant
- ▶ non-conducting (optional)
- ▶ 100% recyclable
- ▶ non-rottening

The main applications are:

- ▶ fender panel facing
- ▶ sliding strips
- ▶ V Fender front shields
- ▶ lock doors
- ▶ quay wall protection
- ▶ beltings for barges, tug boats and supply vessels





The manufacturing process does limit the cross-sections and plate dimensions:

- ▶ Thickness from 2-200mm
- ▶ Plates sizes 1000 x 1000mm up to 6000 x 2000mm

The standard colour is black. Other colours such as green, yellow, white or red are available upon request.

#### PHYSICAL + MECHANICAL PROPERTIES OF UHMW-PE

| Property                        | Current Norms and Values |                        |                          | Obsolete Norms and Values |                        |                          | Unit                 |
|---------------------------------|--------------------------|------------------------|--------------------------|---------------------------|------------------------|--------------------------|----------------------|
|                                 | Norm                     | Virgin Material        | Reclaimed Material       | Norm                      | Virgin Material        | Reclaimed Material       |                      |
| Density                         | ISO 1183-1               | 0.93 ~ 0,94            | 0.94 ~ 0,96              | DIN 53479                 | 0.93 ~ 0,94            | 0.94 ~ 0,96              | g / cm <sup>3</sup>  |
| Molecular Weight                | Viscosimetric Method     | ~ 5,000,000            | ~ 4,000,000              | Viscosimetric Method      | ~ 5,000,000            | ~ 4,000,000              | g / mol              |
| Friction Coefficient            | DIN / EN / ISO 8295      | 0.15 ~ 0.20            | 0.15 ~ 0.20              | DIN 53375                 | 0.15 ~ 0.20            | 0.15 ~ 0.20              | –                    |
| Tensile Strength                | ISO 527                  | > 17                   | ≥ 17                     | DIN 53455                 | > 17                   | 18 ~ 22                  | N / mm <sup>2</sup>  |
| Breaking Strength               | ISO 527                  | > 40                   | ≥ 30                     | DIN 53455                 | > 40                   | 33 ~ 35                  | N / mm <sup>2</sup>  |
| Break Elongation                | ISO 527                  | ≥ 50                   | > 50                     | DIN 53455                 | > 350                  | > 350                    | %                    |
| Ball Indentation Hardness       | ISO 2039-1               | 38                     | 38 ~ 40                  | DIN 53456                 | 38                     | 38 ~ 40                  | N / mm <sup>2</sup>  |
| Shore Hardness (with V-notch)   | ISO 868<br>DIN 53505     | 61 ~ 63                | 64 ~ 66                  | DIN 53505                 | 61 ~ 63                | 64 ~ 66                  | Shore D              |
| Impact Strength                 | ISO / DIN 11542-2        | ≥ 180<br>coloured      | ≥ 70                     | DIN 53453                 | ~ 140                  | ~ 130                    | mJ / mm <sup>2</sup> |
| Abrasion Sand Slurry Test       | ISO / DIS 15527          | 100                    | 130-150                  | –                         | 100                    | 130-150                  | –                    |
| Temperature Range               | –                        | -80 up to +80          | -80 up to +80            | –                         | -80 up to +80          | -80 up to +80            | °C                   |
| Crystalline Melting Point       | ISO 3146-C               | 133                    | 133 ~ 136                | Polarisation-microscope   | –                      | –                        | °C                   |
| Coefficient of Linear Expansion | DIN 53752                | ~ 2 x 10 <sup>-4</sup> | ~ 1,8 x 10 <sup>-4</sup> | DIN 52328                 | ~ 2 x 10 <sup>-4</sup> | ~ 1,8 x 10 <sup>-4</sup> | K <sup>-1</sup>      |