# How AWD® (Assist Wheel Drive) facilitates Compliance with ISO 11228-2?

The ISO 11228-2 standard defines **physical effort limits** for operators and workers to reduce the risk of **musculoskeletal disorders (MSDs)** associated with **pushing and pulling tasks**. Motorized **AWD®** wheels optimize these operations (pushing, pulling) and enhance the ergonomics of handling equipment.

How?

1. **In reducing physical effort**

The 11228-2 ISO standard sets maximum push/pull effort levels for an operator.

| Effort Limits in ISO 11228-2 | | Initial effort | Holding force |
|---|---|---|---|
| Maximum value subject to conditions | **UNACCEPTABLE AREA (RED)** Deleterious activity area imposing an urgent reduction of constraints | 25 daN | 15 daN |
| Maximum acceptable value | **AREA UNDER CONDITIONS (YELLOW)** Area of activity in which the risk is increased, requiring an in-depth analysis | 23 daN | 13 daN |
| Minimum risk constraint | **ACCEPTABLE AREA (GREEN)** Area of activity in which the risk is reduced for most of the operators | < 10 daN | < 6 daN |

*Indicative value for handling trolley, with handles positioned at an average height of 95 cm from the ground, pushed by a male operator over a distance of 15 meters with a starting frequency of once every 5 minutes. (Caution: values may change depending on condition of use)*

From a 300 kg trolley and above, the exerted force can quickly become critical for an operator. The initial effort may reach or exceed 25 daN—depending on friction, slope, and caster type.

The AWD® 150 delivers a pushing force of 35 daN, significantly reducing the operator's pushing/pulling effort on the equipped trolley, making it easier to handle for the operator.

The same applies to loads exceeding 1000 kg. The reduction provided by the wheel keeps the pushing/pulling effort at acceptable levels.


AWD® 150


AWD® 160

2. **In improving ergonomics**

- Enhanced maneuverability: the motor facilitates movement across different surfaces, including irregular or sloped terrains
- Reduction of demanding movements: operators adopt a more natural posture, reducing strain on the back and shoulders

3. **In enhancing safety and prevention MSD**

- Assisted acceleration and braking ensure greater control over movement
- The reduction of abrupt movements and excessive force lowers the risk of injuries and premature fatigue

By reducing physical strain, improving ergonomics, and enhancing safety, **AWD® wheels facilitate compliance with ISO 11228-2**. They provide an **effective solution** for preventing MSDs and improving working conditions for operators.