*Insert new §1.2.1.1. :*

**“1.2.1.1. For the purpose of this regulation a dolly is defined as a towing trailer designed for the sole purpose to tow a semi-trailer.”**

*Annex 8:*

*…*

**3.1. Combination 1:**

**Description: Rigid truck + Dolly + Semitrailer**

**Masses [tonnes]:**

**M1 = total axle load of rigid truck as coupled**

**M2 = total axle load of dolly and semitrailer as coupled**

**M3 = total axle load of dolly as coupled**

**M4 = total axle load of rigid truck as coupled plus tare weight of dolly**

**M5 = support load at king-pin of semitrailer**

**M6 = M5 + total axle load of semitrailer as coupled**

**Total combination mass = M1 + M2**

**Dimensions:**

**L = distance from drawbar eye to center of dolly axle group [m]**

**Coupling capability requirement:**

**Clevis coupling:** $D=g\frac{M\_{1}\*M\_{2}}{M\_{1}+M\_{2}}$ **†** $V=Max(\frac{54}{L};5\frac{M\_{3}}{L})$**†**

**Fifth wheel:** $D=0.5g\frac{M\_{4}\left(M\_{6}+0,08M\_{4}\right)}{M\_{4}+M\_{6}-M\_{5}}$

**† Dolly with rigid drawbar:**

**This calculated D-value requirement shall be lower than the certified DC-value performance of coupling equipment used.**

 **Dolly with hinged drawbar:**

**This calculated D-value requirement shall be lower than the certified D-value performance of coupling equipment used. With a hinged drawbar there is no V-value requirement.**

**3.2. Combination 2:**

**Description: Tractor + Semitrailer + center axle trailer**

**Masses [tonnes]:**

**M1 = total axle load of tractor as coupled (including support load from semitrailer)**

**M2 = total axle load of center axle trailer as coupled**

**M3 = total axle load of tractor and semitrailer as coupled**

**M4 = support load at king-pin of semitrailer**

**M5 = M4 + total axle load of semitrailer and center axle trailer as coupled**

**Total combination mass = M2 + M3**

**Dimensions:**

**L = distance from drawbar eye to center of center axle trailer axle group [m]**

**X = length of loaded area of center axle trailer [m]**

**a = 2.4 [m/s2] for semitrailer with steel suspension; 1.8 [m/s2] for semitrailer with air suspension**

**Coupling capability requirement:**

**Clevis coupling on semitrailer:** $D\_{c}=0.65g\frac{M\_{3}\*M\_{2}}{M\_{3}+M\_{2}}$$V=a\frac{X^{2}}{L^{2}}M\_{2}$

**Fifth wheel:** $D=0.5g\frac{M\_{5}\left(M\_{1}+0,08M\_{5}\right)}{M\_{1}+M\_{5}-M\_{4}}$

**Note:** $\frac{X^{2}}{L^{2}}\geq 1.0$ **(If less than 1.0, the value of 1.0 shall be used)**

**3.3. Combination 3:**

**Description: Tractor + Semitrailer + Dolly + Semitrailer**

**Masses [tonnes]:**

**M1 = total axle load of tractor as coupled (including support load from first semitrailer)**

**M2 = total axle load of tractor and first semitrailer as coupled**

**M3 = M4 + total axle load of second semitrailer as coupled**

**M4 = total axle load of dolly as coupled (including support load from second semitrailer)**

**M5 = M2 + tare weight of dolly**

**M6 = support load at king-pin of first semitrailer**

**M7 = support load at king-pin of second semitrailer**

**M8 = M7 + total axle load of second semitrailer as coupled**

**M9 = M6 + total axle load of first semitrailer as coupled + M3**

**Total combination mass = M2 + M3**

**Dimensions:**

**L = distance from drawbar eye to center of dolly axle group [m]**

**Coupling capability requirement:**

**Clevis coupling on first semitrailer:** $D=0.65g\frac{M\_{2}\*M\_{3}}{M\_{2}+M\_{3}}$ **†** $V=Max(\frac{54}{L};5\frac{M\_{4}}{L})$ **†**

**Fifth wheel:** $D=Max(D\_{1};D\_{2})$

$$D\_{1}=0.5g\frac{M\_{5}\left(M\_{8}+0,08M\_{5}\right)}{M\_{5}+M\_{8}-M\_{7}}$$

$$D\_{2}=0.5g\frac{M\_{9}\left(M\_{1}+0,08M\_{9}\right)}{M\_{9}+M\_{1}-M\_{6}}$$

**† Dolly with rigid drawbar:**

**This calculated D-value requirement shall be lower than the certified DC-value performance of coupling equipment used.**

 **Dolly with hinged drawbar:**

**This calculated D-value requirement shall be lower than the certified D-value performance of coupling equipment used. With a hinged drawbar there is no V-value requirement.**

**3.4. Combination 4:**

**Description: Rigid truck + center axle trailer + center axle trailer**

**Masses [tonnes]:**

**M1 = total axle load of rigid truck as coupled**

**M2 = total axle load of first center axle trailer as coupled**

**M3 = total axle load of second center axle trailer as coupled**

**M4 = M2 + M3**

**M5 = M1 + M2**

**Total combination mass = M1 + M2 + M3**

**Dimensions:**

**L2 = distance from drawbar eye to center of center axle trailer axle group [m]**

**X2 = length of loaded are of center axle trailer [m]**

**T1 = distance from center of axle group to coupling point of clevis coupling in rear end of first center axle trailer [m]**

**a = 2.4 [m/s2] for semitrailer with steel suspension; 1.8 [m/s2] for semitrailer with air suspension**

**Coupling capability requirement:**

**Clevis couplings:** $D\_{c}=0.9g\frac{M\_{1}\*M\_{4}}{M\_{1}+M\_{4}}$

**V= V1**

$V\_{2}=a\frac{X\_{2}^{2}}{L\_{2}^{2}}M\_{3}$$V\_{1}=\sqrt{\left(a\frac{X\_{2}^{2}}{L\_{2}^{2}}M\_{2}\right)^{2}+\left(\frac{T\_{1}^{2}}{L\_{1}^{2}}V\_{2}\right)^{2}}$



**Note: (If less than 1.0, the value of 1.0 shall be used)**

**Justificataion**

…

For the sake of clarity a definition of a dolly has been included. A dolly can have a rigid or a hinged drawbar. This puts different requirements on the coupling equipment connecting the dolly to the towing vehicle. I.e. with a rigid drawbar that coupling equipment shall withstand dynamic vertical forces generated by the dolly. This is not the case for a dolly with a hinged drawbar. Consequently for a dolly with a rigid drawbar the certified performance values Dc and V shall be compared to the calculated requirements. For a dolly with a hinged drawbar there are no or negligible dynamic vertical forces generated in the clevis coupling. Hence for such dollies the certified performance value D shall be compared with the calculated requirement for longitudinal forces.

It is recognized that some markets e.g. Australia uses the denomination “converter dolly”. This implicates that a semi-trailer by a dolly is converted to a full trailer. This is true when a dolly with hinged drawbar is used. In the case of a dolly with a rigid drawbar this is not true. In this latter case a clevis coupling without certified V-value performance shall not be used. To make this very clear comments have been added in annex 8 to clarify how to handle dollies with hinged and rigid drawbars respectively. In this way a better clarity than in some local regulations is achieved. It is noted that in some markets no couplings without certified V-value performance are installed. In those markets the risk of using inferior clevis couplings is less pronounced.