It would therefore be desirable to provide a novel pipe coupling having an axial restraint system that provides improved gripping of the pipe surface and improved resistance to axial movement of the pipe ends. It would be particularly desirable to provide such a novel pipe coupling that provides improved axial restraint for plastic pipes and that performs better than known pipe couplings under high axial loads.

According to an aspect, there is provided a pipe coupling for connecting together the ends of two pipes, the pipe coupling comprising: a tubular casing for fitting around a pipe; tensioning means for tightening the casing around the outer surface of the pipe; and a dynamic axial restraint system comprising at least one resilient gripping ring mounted within the casing for gripping the outer surface of the pipe, wherein the gripping ring comprises: an outer surface engaging with an inner surface of the casing and adapted to roll against the inner surface of the casing upon axial loading of the pipe; and an inner gripping surface for engaging the outer surface of the pipe, wherein the gripping surface of the resilient gripping ring is adapted such that upon rolling of the outer surface against the inner surface of the tubular casing, the area of the gripping surface in contact with the pipe increases.

~~According to the invention there is provided~~Herein disclosed is a pipe coupling for connecting together the ends of two pipes, the pipe coupling comprising: a tubular casing for fitting around a pipe; a tubular sealing sleeve located within the casing; tensioning means for tightening the casing around the sealing sleeve to seal the sealing sleeve around the outer surface of the pipe; and a dynamic axial restraint system. The dynamic axial restraint system comprises at least one resilient gripping ring mounted within the casing for gripping the outer surface of the pipe. The gripping ring comprises: an outer surface engaging with an inner surface of the casing and adapted to roll against the inner surface of the casing upon axial loading of the pipe; and an inner gripping surface for engaging the outer surface of the pipe, wherein the gripping surface of the resilient gripping ring is adapted such that upon rolling of the outer surface against the inner surface of the tubular casing, the area of the gripping surface in contact with the pipe progressively increases.

In the following specification, the term "axial" is used to refer to the direction defined by the longitudinal axis of the pipe and the term "radial" is used to refer to a direction defined by a radius of the pipe.

The pipe coupling of the present invention incorporates a dynamic axial restraint system having a gripping ring that is able to adapt to a higher level of axial loading on the pipe by rolling relative to the casing such that a larger area of the inner gripping surface of the gripping ring is brought into engagement with the outer surface of the pipe. The gripping ring therefore improves its grip on the pipe under high axial loads by increasing the surface area of the ring that grips the pipe, rather than forcing the gripping ring deeper into the pipe

surface, as with the gripping rings of the prior art. This means that the level of radial stress to which the pipe is subjected by the pipe coupling of the invention is significantly lower than for known pipe couplings.

The pipe coupling of the present invention is particularly suitable for use in the coupling of plastic pipes since the increase in the gripping area upon increased axial loading enables the axial restraint system to more effectively withstand the migration of the plastic from the regions of high stress and thereby maintain a strong axial restraint whilst retaining a low level of radial stress. The axial restraint system additionally reduces the level of cutting of the gripping ring into the pipe surface, which reduces the degradation of the relatively soft plastic pipe.