

Blender Fill Level Guidelines





GEMCO's Recommended Range of Blender Working Volumes

For over 100 years GEMCO has produced world-class blenders for the most demanding of applications for the pharmaceutical, cosmetic, chemical and additive metals production industries.

One of the most frequently asked questions our customer support group encounters is what are the recommended range of blender working volumes. If a blender can produce effective blend uniformity at a range of fill levels it would increase production flexibility and productivity.

GEMCO generally recommends a working volume of about one half of the total internal volume. This level of fill is often referred to as 100% of working volume. In reality, the fill level at which effective mixing may be achieved is much broader. This is because the geometry of certain vessels continues to provide effective particle mobility and cross mixing even at different fill levels.

Produce Effective Blend Content Uniformity

The table and diagrams herein show the range of fill levels which have produced effective blend content uniformity for the three blender geometries produced by GEMCO: the Double Cone, the Slant Cone and the V Shape.

The GEMCO design principle of consistent axial rotation proportional to the size of the blender removes rotation speed from consideration as a variable. The use of an agitator impacts the discussion of fill level variability in a practical sense because for the agitator to be effective it must come into contact with the product.

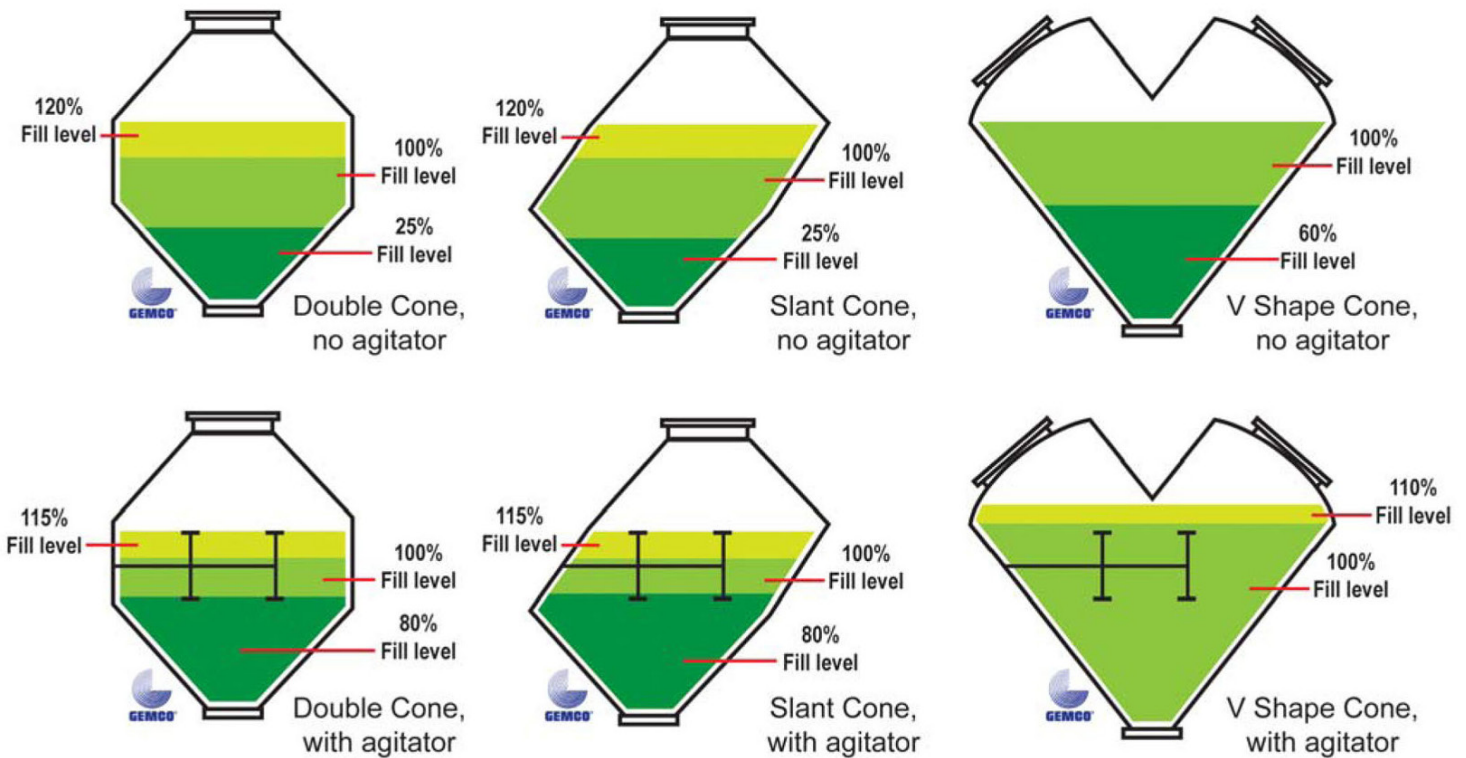
| Shape | Agitator | Minimum Fill | Maximum Fill |
|---------------------------|----------|------------------------|------------------------|
| Double Cone | ✗ | 25% of Working Volume | 120% of Working Volume |
| Slant Cone | ✗ | 25% of Working Volume | 120% of Working Volume |
| V Shape | ✗ | 60% of Working Volume | 100% of Working Volume |
| Double Cone or Slant Cone | ✓ | 80% of Working Volume | 115% of Working Volume |
| V Shape | ✓ | 110% of Working Volume | 100% of Working Volume |

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Setting Industry Standards by Exceeding Customer Expectations



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Whatever your blending requirements, GEMCO has the solutions to fit your process.

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The Relationship Between Weight and Volume

It is important to remember that fill level is a volume measurement, not a measure of weight.

The bulk density of the final blend must be used to approximate fill level. The enclosed table provides an example to show the relationship between weight and volume.

Note: These values are provided as a guideline only. Many factors contribute to effective blend uniformity. Validation would need to occur on a case by case basis. Effective mixing is a function of characteristics of both the blender and the materials to be mixed. The critical characteristics of the materials to be mixed are the cohesiveness, angle of repose and particle size distribution. The impact of material characteristics cannot be over emphasized as this is the origin of greatest variability and opportunity for demixing.

| English | Vessel Size Working Volume | Bulk Density | % of Working Volume | | |
|---------|-------------------------------|---------------|---------------------|----------|----------|
| | | | 25% | 100% | 120% |
| | 100 Cu. Ft | 40lbs/Cu. Ft. | 1000 lbs | 4000 lbs | 4800 lbs |

| Metric | Vessel Size Working Volume | Bulk Density | % of Working Volume | | |
|--------|-------------------------------|--------------|---------------------|---------|---------|
| | | | 25% | 100% | 120% |
| | 2830 L | 0.64 Kg/L | 454 Kg | 1814 Kg | 2177 Kg |