Techimpex Rotating Machine Skates – Operational Manual / Technical Considerations

Techimpex Machine Skates Technical Considerations

Successfully utilizing machine skates for moving heavy industrial loads, equipment and machinery requires technical consideration and careful planning.

How will the load be lifted the necessary amount to clear the height of the machine skates?

Methods for lifting and raising the load "up" can include hydraulic jacks, toe jacks, forklifts, overhead cranes, winch systems, etc.

How much does the equipment, load or machine being moved weigh?

Entering any kind of machine moving project without having a really close idea of the weight of the load can be dangerous. It is best to know within a very small margin of error the amount of weight that will be placed on the machine skates to prevent over loading and possible damage to the equipment or other load being moved.

Is the weight distributed equally across the load?

Most loads that will be moved will be somewhat symmetrical in their weight profile. Sometimes though, it may be necessary to allow for the possibility of the load being heavier or lighter on one end or the other. One possibility may be to use different weight capacity machine skates on the respective ends of the load. However, the best solution is to utilize various machine skate models that provide more than adequate weight capacity so there is a margin for error.

How many points of contact are necessary when the load is resting on the machine skates?

The short answer is however many it takes! However, depending on the weight of the load, the length and width of the load, and the rigidity of the support structure under the load, it may be necessary to use 3 or more points of contact to give the load the proper support and stability it needs while resting on the machine skates. More time spent pre-planning a heavy industrial equipment move will save time and effort later.

How much force will be needed to move the load once it is resting on the machine skates?

Once the load is lowered onto the skates, there must be sufficient means to move and maneuver the load. For lighter loads, as a broad rule of thumb, one person can move around 2 tons on a smooth, level, debris-free surface. As the weight of the load increases, it will take significantly more manpower and horsepower (usually forklifts, power pushers, wenches, etc.) to successfully maneuver and position the heaviest loads. Keep in mind that once the load is moving it must be STOPPED as well so make sure and think ahead. Most of the models of machine skates that TechimpexUSA manufactures and sells are expected to be used under fairly large loads, so a means of power to push or pull the load is almost always necessary.

A further note on skate and dollies loading is that the closer the weight of the load is to the maximum carrying capacity of the skates being used, the harder it will be to turn, rotate and maneuver them. The design of the urethane roller is to "give" or flatten as the weight placed on them increases. As such, when the weight on the skates increases toward their maximum rating, the urethane rollers flex and flatten even more and this increased surface area of roller in contact with the floor will take more force to maneuver. The design of TechimpexUSA machine skates is robust and they will certainly handle loads up to their maximum capacity. However, it should be expected that more force will have to be applied to the load itself or the attached handles in order to get the desired turning results as the load approaches the maximum load capacity of the skate.

If ease or turning and maneuvering is paramount, then it may be best to purchase machine skates which will well exceed the expected weight of the heavy load being moved.

How much maneuverability is needed to guide the load into the desired space?

The ability to turn and rotate the load (space constraints) after it is resting on the machine skates must be evaluated because the different styles of skates and dollies available (RT rotating, SFT 3-point, ST steerable, FT fixed, IFT single) and the configurations in which they are placed will provide varying ranges of maneuverability. Make sure there is always adequate room to turn and manipulate the load safely into place. The RT rotating machinery skates provide the best option for handling industrial loads in tight quarters.

How much pressure is exerted on the floor under a loaded machine skate?

All of TechimpexUSA skates and dollies use the same size high-quality urethane roller which is 3.25 inches in diameter and 3.25 inches in width. At any one time a heavy load will compress the rollers to some degree equating to a footprint of approximately 1 to 1.25 square inches per roller. As the weight on the machine skates increases, the deformation or flattening of the urethane rollers increases. So, in effect, as the load increases the flattening of the rollers actually spreads out the load over more surface area increasing the footprint and spreading out the pressure on the floor.

It is a simple, straight-forward calculation to divide the total number of urethane rollers into the total amount of weight on the machine skates to figure out the pressure exerted on the floor by each individual roller.

Pressure Calculations at Maximum Loads

Load weight (lbs) divided by # of rollers divided by roller footprint (square inches) = Pressure per roller (lb/sq-in or psi)

For example, the RT-8 rotating machinery skates fully loaded would produce 2,560 psi of pressure per roller.

* 16,000 lbs divided by 5 rollers divided by a 1.25 square inch footprint = 2,560 psi of pressure per roller

Can the machine skates be used on a rough or uneven surface?

This is a hard question to give a blanket answer that will fit all situations, but we will attempt to offer some guidance. The urethane rollers are designed to be non-marking and non-damaging to flooring surfaces, and as such, are fabricated with a high-quality urethane material. Therefore, use over a rough but level surface should not affect the usefulness of the rollers. However, over time, a rougher surface may tend to pit and deteriorate the coating of the urethane rollers. If, after a period of time, the roller's surface becomes too damaged to work effectively TechimpexUSA stocks plenty of replacement urethane rollers that can be quickly and conveniently replaced with our unique axle end bolt design.

It should be noted that in order to have a machine skate system that will not damage flooring, it only makes sense that the rollers that contact the flooring surface cannot be made of an excessively hard material. However, for longevity, one might theoretically opt for an all-steel roller. While these might be fine for a very hard surface where the user does not mind marking up the flooring, they would not be very versatile for other types of flooring. Also, steel rollers can still be very damaging to even the hardest concrete or flooring material. Although, it is true that these types of steel rollers will basically last forever, they cannot be used on any kind of flooring that a user does not want damaged or marred.

Therefore, it is imperative that the roller be made of some type of “giving” material. This is the purpose of the high-quality urethane rollers used by TechimpexUSA. They are intentionally made “soft” (soft is a relative term here, the rollers are as hard as a rock, but they do “give” under heavy loading) enough to protect flooring by flattening and flexing, but are still “hard” enough to give many years of service under the right conditions (depending on roughness and abrasiveness of the surfaces on which they are used). Therefore, TechimpexUSA offers an all-around type of roller that will both “give” and be “tough” at the same time.

What about a surface with excessive cracking or significant changes in elevation?

The first thing to keep in mind is that the urethane rollers are only 3.25 inches diameter with a footprint (as shown above) of 1 to 1.25 square inches. As such, any crack or hole in the ground wider than a basic, normal concrete expansion joint can present problems. These can be overcome by rolling the machine skates over such areas at an angle which will keep the line of urethane rollers from “dropping” into the crack at the same time which will have the effect of bridging the crack. Another solution is to fill the cracks with an acceptable filler to even out the transition area or to use thin metal plating to bridge the excessive cracks and holes that may be in the intended moving path.

Another area of concern that comes up is abrupt changes in the elevation of the flooring. This could be something like a crack in concrete flooring where one side has heaved up, forming a ledge, or an abrupt change in grade like a level floor transitioning to a ramp. TechimpexUSA machine skates are designed for low clearance so that loads do not have to be raised very far in order for the skates to be positioned underneath. Consequently, the steel frames run very close to the ground so steps should be taken to use plating, fillers, etc. to overcome significant and abrupt ledges/obstructions in the flooring and to make the transitions as gentle and subtle as possible.