received information indicating that there are at least five possible methods for determining the full charge of a system. Each of these methods has limitations. However, EPA believes that the alternative to these methods would be to require the operators of industrial process refrigeration equipment to evacuate the systems and add refrigerant a little at a time while checking the effect on cooling. EPA believes that an attempt to proceed in that manner would cause an unreasonable burden on the affected community.

The first method for determining the full charge of the system is to rely on the manufacturers' determinations. The benefit of this system is that typically the manufacturer provides a single number rather than a range. The limitations include the infrequency with which the manufacturer may actually provide this information and the occasion to question the number's accuracy. Questions concerning the accuracy of the number will reflect the fact that industrial process refrigeration equipment is often custom-built; therefore, a particular system may be a one-of-kind appliance for which the manufacturer's determinations may only be an estimate. Furthermore, the owner or operator of a particular system may have made subsequent modifications, which would adjust the full charge of the system. Moreover, even where the manufacturer's estimates may initially appear reasonable, experience with actual use of the equipment may indicate the need to revise the estimate.

The second method for determining the full charge of a system is to require the owner or operator to do calculations. In some cases the owners or operators of a system should be able to estimate a full charge by calculations based on component sizes, flow rates, pressures, and other considerations. Of course, these calculations may become very complex due to the number of individual pipes, tubes, and other parts the system contains. Additionally, each measurement or assumption that goes into the total calculation will have a margin of error. Consequently, although this method has the benefit of being based on objective criteria and methods, the resulting number may be subject to change as methods are refined or experience with the system increases.

The third method is to rely on actual measurements of the amount of refrigerant added or evacuated from an industrial process refrigeration system. Although this may be a more accurate method and would provide a single number rather than a range of the full charge, evacuating a system is not always practical. For example,

evacuating the entire charge may require a process shutdown and a place to store that refrigerant. In addition, the exact measurement may only represent the amount of refrigerant evacuated. Since the system could have been below or above full charge when the evacuation was performed or some refrigerant may have been lost during evacuation, the amount of refrigerant evacuated may not be an accurate measure of the full

charge of the system.

A fourth method for determining the full charge of a system is to choose a number from within an established range based on the best data currently available. In situations where the refrigerant system functions properly within a range of quantities, the owner or operator may choose a number from within the range based on the data and consider that number to be the full charge. Once a number is selected that number would be considered the full charge. Over time the owner or operator of the system may adjust this number based on new or revised information concerning the performance of the system, thereby potentially increasing the accuracy of the full charge estimate. However, the drawback to this method is that there is no clarity regarding the circumstances under which a change in the number could be justified. An everchanging estimate of the full charge defeats the purpose of creating such a baseline. Therefore, the Agency proposes that this method not be included in the list of method options from which owners and operators can

determine full charge.

The last method for determining the full charge of a system is to establish a definition of full charge that is based on maximum cooling performance. One possible approach is to define the full charge as the minimum amount of refrigerant necessary for a system to achieve its maximum refrigerant performance during times of maximum process heat load. This would include consideration of the production process and the most adverse ambient conditions normally encountered. This definition has a major drawback. Because it is based on cooling performance, it does not give a number in the context of pounds of refrigerant in the system. Several other factors could affect cooling performance, severely skewing the calculation of full

EPA believes that it is appropriate to use any of the first three methods to establish the full charge for an industrial process refrigeration system; however, EPA believes that the last two methods would not be appropriate. EPA is concerned with the last two methods

because of the lack of objectivity and the possibility for frequent adjustments. Furthermore, EPA believes it is critical that the owners or operators of a particular system use both a consistent and accurate approach for determining the full refrigerant charge. Such an approach may include one of the first three methods, or a combination of them to establish the full charge of a system. For example, the owners or operators may wish to consider the manufacturer's estimates in conjunction with its own calculations. Once the full charge is established, a leak rate can be based upon this number. However, constantly changing the methodology for establishing the full charge could alter the determination of the leak rate for the system. Within reason, EPA could allow for a particular facility to adjust its method for determining the full charge where a change would lead to a more accurate estimate of the full charge; however, EPA would also take consistency into account.

In today's action, EPA proposes that the first three methods, or a combination of them, may be used to determine the full charge. EPA requests comments on the five methods for determining the full charge of a system discussed above, and the appropriateness of the methods proposed. In addition, EPA requests comments on other potential methods for establishing the full charge of an industrial process refrigeration

appliance.

E. Static and Dynamic Tests

EPA is proposing that the repair efforts required for industrial process refrigeration equipment be those that sound engineering judgment indicates will be sufficient to bring the leak rates below a 35 percent annual rate, that a static test be conducted at the conclusion of the repairs to determine whether the repairs undertaken were successfully completed, and that a dynamic test be conducted within 30 days of bringing the system back on-line (if taken off-line) or of completing the actual repairs, but no sooner than when the system has achieved steady-state operating characteristics. EPA is also proposing that the system not be brought back on-line, in the case where it was taken off-line, until a static test indicates that the repairs undertaken have been successfully completed. If the dynamic test indicates that the repairs have not been successfully completed, EPA proposes that the owner would be subject to a requirement to retrofit or replace the equipment within one year of the failure to verify that the repairs had been successfully completed or