

Critical Thinking Questions – Material Recovery Facilities

1. Describe a materials recovery facility (MRFs).
2. Describe the seven types of MRFs outlined in the video
3. What are some of the physical requirements (space, equipment) for an MRF?
4. Your first week on the job as an engineering consultant, you have been asked to perform some design calculations for a new MRF being built in your city. You are asked to come up with the following information for your client, the city public works department. Present your findings in a short design report.
 - a) What total amount of recyclables can be expected to be produced on a yearly basis (residential only)?
 - b) What is the composition of the recyclables stream?
 - c) What amount of recyclables can be expected to be delivered to the MRF, taking into account recycling participation rates? You can assume the entire population is serviced by curbside recycling programs.
 - d) Based on the composition of recyclables determined in part 2, what unit operations would you recommend for the MRF? Sketch a general flow diagram of the unit operations.
 - e) If the MRF needs to have space for 1 week of storage for baled recyclables, calculate the minimum storage area required.

Material	Initial Density (lb/yd³)	Baled Density (lb/yd³)
Newspaper	475	950
Corrugated cardboard	350	800
Clear glass - whole bottles	500	
Semicrushed glass	1000	
1.5 in mechanically crushed	1800	
1/4 in. furnace ready	2700	
Aluminum cans	50	950
Whole PET	34	750

Data provided by Dr. Morton Barlaz, NC State University

Recovery Factors at a Material Recovery Facility

Material	Manual Sorting		Machine Sorting	
	Range	Typical	Range	Typical
mixed paper	60-95	90		
cardboard	60-95	90		
HDPE	80-95	90		
PET	80-95	90		
Mixed plastics	80-98	90		
glass	80-98	90	50-90	80
Tin cans	80-95	90	65-95	85
Aluminum cans	85-95	90	60-90	75

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