Understanding how disks dissipate is essential to studies of planet formation. However, identifying exactly how dust and gas dissipates is complicated due to difficulty in finding objects clearly in the transition of losing their surrounding material. We use Spitzer IRS spectra to examine 35 photometrically-selected candidate cold disks (disks with large inner dust holes). The infrared spectra are supplemented with optical spectra to determine stellar and accretion properties and 1.3mm photometry to measure disk masses. Based on detailed SED modeling, we identify 15 new cold disks. The remaining 20 objects have IRS spectra that are consistent with disks without holes, disks that are observed close to edge-on, or stars with background emission. Based on these results, we determine reliable criteria for identifying disks with inner holes from Spitzer photometry and examine criteria already in the literature. Applying these criteria to the c2d surveyed star-forming regions gives a frequency of such objects of at least 4% and most likely of order 12% of the YSO population identified by Spitzer.

We also examine the properties of these new cold disks in combination with cold disks from the literature. Hole sizes in this sample are generally smaller than for previously published objects. The cold disks presented here have small hole sizes, generally less than 10 AU. This distribution is more in agreement with the sizes of most cold disks in the literature.

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A large fraction (75%) of the cold disks are accreting, suggesting that gas is flowing through the dust depleted hole. This large fraction of accreting disks is not in agreement with the dominant hole origin being photoevaporation.

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The 10 μm silicate features in the sample show substantial grain growth. The 10 μm silicate emission feature strength with respect to continuum decreases drastically for inner holes larger than ~7 AU. Some (33-60%) of the cold disks show long wavelength crystalline features indicating that mixing from the inner regions where crystallization occurs to outside the inner hole region must be efficient. Only 2 source (~13%) show PAH emission.