



# Closed system drug transfer devices

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"CSTD", "?", "CSTD", "CSTDs", ...

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Closed System Drug-Transfer Device (CSTD) should be used throughout the hazardous drug-handling chain, from pharmaceutical compounding to patient dose administration.

NIOSH defines a Closed System Drug-Transfer Device (CSTD) as "a drug transfer device that mechanically prohibits the transfer of environmental contaminants into the system and the escape of the hazardous drug or vapor concentrations outside the system" 1. Currently, CSTDs generally follow one of two design concepts, using either a physical barrier or an air-cleaning technology to prevent the escape of hazardous drugs into the work environment. When appropriately designed and used, CSTDs offer enhanced protection against potentially hazardous exposures to healthcare workers during the compounding and administration of hazardous drugs.

NIOSH recommends healthcare workers use a CSTD throughout the hazardous drug-handling chain, from pharmaceutical compounding to patient dose administration.<sup>2</sup> CSTDs should not be the only means of worker protection. They should be used as part of a hazardous drug safety program and used in conjunction with other engineering controls.<sup>1</sup>

As CSTD designs and available models changed, NIOSH and its industry partners realized the need for an independent testing method for CSTD performance.

While CSTD performance standards are available that apply to sterile practice and patient protection, no CSTD performance standards are available for drug containment.<sup>3</sup> To address this gap, NIOSH researchers are developing a test protocol that evaluates a CSTD's containment of hazardous drugs.

The following is information on NIOSH CSTD research activities and includes links to early draft protocols, other associated documents, and public comments. Also provided is an update on the research status of the most-recent NIOSH draft CSTD test protocol. This is a unified test protocol for both air-cleaning and barrier type CSTDs. Check back for more on this continuing NIOSH research project and other relevant CSTD information.

NIOSH published a public comment draft protocol entitled, "A Vapor Containment Performance Protocol for



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Closed System Transfer Devices Used During Pharmacy Compounding and Administration of Hazardous Drugs." The draft protocol tested the containment performance of the physical-barrier type of CSTDs, but it was not designed to test air-cleaning type CSTDs.

NIOSH scientists developed this protocol with input from registered pharmacists experienced with CSTD use. The pharmacists performed the protocol's prescribed compounding and administration tasks for five commercially available CSTDs with 70% isopropyl alcohol (IPA) as the challenge agent. They also tested a negative control condition without a CSTD. The tests were conducted in an environmental test chamber, and a gas analyzer was used to detect vapor concentrations of escaped IPA during the tasks.

This protocol had several potential applications including that it could be used by:

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Web: <https://www.kary.com.pl/contact-us/>

Email: [energystorage2000@gmail.com](mailto:energystorage2000@gmail.com)

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