General Characteristics		
1	**Abstract of Model Capabilities**	CFAST, within the limitations of a zone model solution of the mass and energy conservation equations, can estimate compartment temperatures and species concentrations in a facility in which a fire is postulated to occur. The code has aa front-end module, Cedit, that allows the user to develop the input deck via a series of menus. Cplot, a post-processing module, generates on-screen hard copy plots of the data generated by CFAST.
2	**Sponsor and/or Developing Organization**	National Institute of Standards and Technology (NIST) Building and Fire Research Laboratory Gaithersburg, MD 20899
3	**Last Custodian/ Point of Contact**	Mr. Walter W. Jones National Institute of Standards and Technology (NIST) Building and Fire Research Laboratory Gaithersburg, MD 20899
4	**Life-Cycle**	Elements of FAST and CCFM.VENTS codes were merged to generate CFAST.
5	**Model Description Summary**	CFAST is a zone model solution of the mass and energy conservation equations. With respect to fires, a growth model is not included in the program. However, specific fire-related physics dealing with hot gas layers, fire plumes, door jets, radiative heat transfer, and ignition of secondary fires are modeled. In addition, a building ventilation system (e.g., ducts, vents, fans), can be included in a facility model.
6	**Application Limitation**	See weaknesses. CFAST has limited chemical source term generation and transport capabilities, and no explicit ability to model radiological source terms.
7	**Strengths/ Limitations**	**Strengths:** can address multiple fires; capable of modeling ventilation systems; inclusion of a materials data base; ca input customized material properties; and, specifically models HCL deposition. **Limitations:** requires an a priori specification of the temporal behavior of a fire; does not calculate radiological source terms; limited by assumptions in the zone model formulation of the conservation equations; does not model mitigative systems; does not output all important variables; momentum is not explicitly considered in the conservation equations; and, limited access to modeled variables.
8	**Model References**	**!** Peacock, R.D., et al., "CFAST, the Consolidated Model of Fire Growth and Smoke Transport", NIST Technical Note 1299, National Institute of Standards and Technology, Gaithersburg, MD, 1993. **!** Portier, R.W., et al., "A User's Guide for CFAST Version 1.6", NISTIR 4985, National Institute of Standards and Technology, Gaithersburg, MD, 1992.
9	**Input Data/Parameter Requirements**	A CFA ST input deck is typically no larger than 2 or 3 pages, and is fairly easy to produce. A deck can be generated using an ASCII text-editor or via Cedit, a menu-driven front-end utility. The input parameters required by CFAST are: **!** room geometry; **!** fire growth behavior as a function of time; **!** ventilation system geometry and temporal behavior; **!** fire constraints (e.g., oxygen limitations, various specie ratios); **!** wall, floor, and ceiling material properties; and, **!** combustible objects (optional).
10	**Output Summary**	CFAST can generate tabular (ASCII) and HPGL graphics output. The output variables are: layer interface height; upper and lower layer temperature; surface temperature of walls, floors, and ceilings; pressure; fire locations; optical density; some flow rates; and, species concentrations.
11	**Applications**	CFAST is applicable to analyses in which the impact of a fire (i.e., room temperature and smoke transport) need to be evaluated. It has limited chemical source term generation and transport capabilities, and no explicit modeling ability relative to radiological source terms.
12	**User-Friendliness**	The Cedit and Cplot utilities are helpful. However, many of the model features are not well documented.
13	**Hardware-Software Interface Constraints/ Requirements**	IBM PC-compatible 80386 processor or better with at least 2.5 megabytes of free extended memory, VGA graphics or Silicon Graphics machine. PC platform of MS-DOS 5.0, its equivalent, or higher. Can be run in windows inside a full-screen DOS window.
14	**Operational Parameters**	CFAST does return some error messages, although somewhat cryptic.

15	**Surety Considerations**	**Quality Assurance:** User's Manual: Portier, R.W., et al., "A User's Guide for CFAST Version 1.6", NISTIR 4985, National Institute of Standards and Technology, Gaithersburg, MD, 1992. **Benchmarking and V&V:** **Benchmarking:** Peacock, R.D., et al., "CFAST, the Consolidated Model of Fire Growth and Smoke Transport", NIST Technical Note 1299, National Institute of Standards and Technology, Gaithersburg, MD, 1993. **Code Verification:** Peacock, R.D., et al., "CFAST, the Consolidated Model of Fire Growth and Smoke Transport", NIST Technical Note 1299, National Institute of Standards and Technology, Gaithersburg, MD, 1993, and; Jones, W.W., "A CFAST Output Comparison Method and Its Use in Comparing Different CFAST Versions", 1992. **Validation Against Experimental Data:** Peacock, R.D., et al., "CFAST, the Consolidated Model of Fire Growth and Smoke Transport", NIST Technical Note 1299, National Institute of Standards and Technology, Gaithersburg, MD, 1993.
16	**Runtime Characteristics**	Depending on the complexity and duration of the problem, and the computational platform, runs will range from a few minutes to 1-2 hours.

Specific Characteristics

Part A: Source Term Submodel Type

A1	**Source Term Algorithm?**	✔YES __NO

Part B: Dispersion Submodel Type (Not Applicable)

Part C: Transport Submodel Type (No Information Provided.)

Part D: Fire Submodel Type (No Information Provided.)

Part E: Energetic Events Submodel Type (Not Applicable)

Part F: Health Consequence Submodel Type (Not Applicable)

Part G: Effects and Countermeasures Submodel Type (Not Applicable)

Part H: Physical Features of Model (No Information Provided.)

Part I: Model Input Requirements (See Item 9.)

Part J: Model Output Capabilities (No Information Provided.)

J2	**Graphic Contours and Resolution**	Yes
J4	**Tabular at Fixed Downwind Locations**	Yes

Part K: Model Usage Considerations (No Information Provided.)