

JEFFCOOL®

Industrial Coolants and Heat Transfer Fluids





JEFFCOOL® INDUSTRIAL COOLANTS AND HEAT TRANSFER FLUIDS

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JEFFCOOL® E100 Industrial Coolant and Heat Transfer Fluid

JEFFCOOL® E100 COOLANT

DESCRIPTION

JEFFCOOL E100 coolant is an inhibited ethylene glycol used as an industrial coolant and heat transfer agent. The inhibitor system is designed to protect brass, copper, solder, steel, cast iron, aluminum, and other metals commonly found in industrial cooling and heating systems. A foam inhibitor is included to minimize foaming tendencies during service.

The effectiveness of JEFFCOOL E100 coolant in preventing corrosion has been proven in extensive laboratory simulated service and in actual service tests. Using JEFFCOOL E100 coolant for heat transfer applications in place of brine solutions or uninhibited glycol-water solutions lowers maintenance costs and improves heat transfer.

CAUTION: JEFFCOOL E100 coolant must not be used where contact with food or potable water is possible. JEFFCOOL P200 coolant is available for applications in which contact with food or potable water is possible.

TYPICAL PROPERTIES		Test Method
Ash, wt. %	1.9	D-1119
Color	Red	
Density, 60°F, lb/gal	9.42	D-1122
Equilibrium boiling point, °F 50 vol. % aqueous solution	228	D-1120
Flash point, COC, °F	260	D-92
Foaming tendency, vol., ml Break time, sec	40 1.5	D-1881
Freezing protection, °F 20 vol. % aqueous solution 30 vol. % aqueous solution 40 vol. % aqueous solution 50 vol. % aqueous solution	14 3 -13 -34	D-1177
pH, 331/3 vol. % aqueous solution	10	D-1287
Refractive index, n _D , 77°F 50 vol. % aqueous solution	1.3848	
Reserve alkalinity	12.0	D-1121
Specific gravity, 60/60°F	1.136	D-1122

APPLICATIONS

Line Heaters

JEFFCOOL E100 coolant is recommended as a heat transfer fluid for line heaters. A line heater circulates a heated fluid around a pipe to raise the temperature of the pipe contents in order to control reactions or ease pumping operations.

Snow-Melting and Refrigeration Systems

JEFFCOOL E100 coolant is recommended as a heat transfer fluid for snow-melting systems for loading ramps, walkways, highways, and airfield runways, and as a coolant in ice rinks and air conditioning systems.

Thermal Energy Storage, Heating and Cooling Systems

JEFFCOOL E100 coolant is recommended as a heat transfer fluid in combination heating and cooling systems for large buildings. The excellent corrosion protection afforded by JEFFCOOL E100 coolant prolongs the life of the piping in these systems. JEFFCOOL E100 coolant is also an excellent heat transfer medium for solar energy collection systems.

Other Industry Applications

- Automotive and aircraft manufacturers
- Chemical manufacturers
- Dye and dye intermediate producers
- Electric power companies
- Ice skating rinks
- Paint, varnish, and lacquer companies
- Paper and paper product companies
- Plastics and synthetic resin manufacturers
- Textile chemical manufacturers

JEFFCOOL[®] E100 Industrial Coolant and Heat Transfer Fluid *Continued*

HANDLING AND STORAGE

JEFFCOOL E100 coolant may be stored in unlined carbon steel tanks and drums. If storage of undiluted JEFFCOOL E100 coolant for periods exceeding 12 months is desired, it is recommended that the storage vessels be constructed from aluminum, stainless steel, or lined carbon steel. Vinyl, epoxy, and phenolic linings are suitable. Amercoat[®]-23 and Amercoat[®]-75 linings have been found satisfactory. Stocks of JEFFCOOL E100 coolant should be rotated every two to three years, if possible.

Undiluted JEFFCOOL E100 coolant may freeze where ambient temperatures fall below 0°F. Freezing points of various aqueous solutions of JEFFCOOL E100 coolant are shown in Figure 1. Freezing will not harm JEFFCOOL E100 coolant; however, when the temperature of undiluted JEFFCOOL E100 coolant is below 40°F, the viscosity will be such that pumping and transfer will be difficult. In areas where these conditions exist, it is recommended that storage vessels be equipped with stainless steel heating coils. Diluted JEFFCOOL E100 coolant is easily pumped under normally encountered temperatures.

The normal precautions associated with any chemical should be observed in handling JEFFCOOL E100 coolant, although it is neither explosive nor flammable under normal storage conditions. The ethylene glycol in JEFFCOOL E100 coolant is toxic if taken internally. Splashes onto eyes or skin must be washed away quickly and medical treatment is advised for eye exposure. Breathing of the vapors or mists should be avoided. For additional information, see the Toxicity section.

PREPARATION OF THE COOLING SYSTEM

Before JEFFCOOL E100 coolant is added to a new cooling system, the system should be washed and thoroughly flushed with water. This will remove pipe scale, welding slag, dirt, and other impurities.

Existing systems that are being filled with JEFFCOOL E100 coolant should be thoroughly cleaned to improve heat transfer characteristics and prevent contamination of the coolant. Regardless of the cleaning agent used, the system must be thoroughly flushed with water before the JEFFCOOL E100 coolant is added. Cleaning agents used should be handled in strict accordance with instructions furnished by their suppliers.

Whenever an existing system is cleaned, a few leaks may be discovered. The presence of the proper maintenance people and equipment during cleaning will result in a much smoother operation.

INSTALLATION OF JEFFCOOL E100 COOLANT

Dilution of JEFFCOOL E100 coolant with water is necessary to obtain proper freeze protection. This should be done prior to installation. Topping-off of cooling systems should be done with a pre-diluted JEFFCOOL coolant solution at the required system concentration.

SYSTEM DILUTION CONCENTRATIONS

The freezing protection offered by specific concentrations of JEFFCOOL E100 coolant is shown in Figure 1. It is recommended that a safety margin of at least 5°F be maintained for the lowest temperature anticipated. For example, a system with a 1,000-gallon capacity should be filled with 470 gallons of JEFFCOOL E100 coolant and 530 gallons of water if a solution freezing

point of -20°F is desired. To ensure adequate corrosion protection, concentration less than 25% by volume of JEFFCOOL coolants should not be used.

DILUTION WATER SPECIFICATIONS

The use of hard water in JEFFCOOL E100 coolant solutions should be avoided. Hard water contains calcium and magnesium ions which deposit scale in the system and could also cause precipitation of a portion of the inhibitor system. Softened water is not recommended because the water softening process may add chlorides and sulfates which may contribute to system corrosion. Where poor water conditions exist, distilled, deionized, or boiler condensate water should be used. If a suitable water source is not available, pre-diluted JEFFCOOL formulas are available from a Huntsman authorized distributor.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

SYSTEM MAINTENANCE PROGRAM

Huntsman Corporation, in conjunction with our authorized JEFFCOOL brand product distributors, provides a comprehensive system maintenance program, including

a product analysis service to assure that JEFFCOOL E100 coolant in customer systems maintains the proper inhibitor level and desired freeze protection. Once the system is in operation, it is recommended that samples of solution be taken at least once a year. The solution should be circulated for 30 minutes prior to sampling to ensure a representative sample.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures. Analytical results from the samples will be forwarded to customers.

REINHIBITING PROCEDURE

Occasionally, after prolonged or severe service, a solution of JEFFCOOL E100 coolant may need to be reinhibited. The need for reinhibition will be detected during the periodic analysis program and a recommended procedure will be included with the analytical results.

JEFFCOOL supplemental coolant additives (SCA) are available in five gallon and 55 gallon drum quantities from your JEFFCOOL representatives. The components of JEFFCOOL SCA replenish critical inhibitors required to provide continued protection.

Additives used in inhibiting JEFFCOOL E100 coolant should be handled in strict accordance with instructions furnished by their suppliers.

JEFFCOOL® E100 Industrial Coolant and Heat Transfer Fluid *Continued*

TOXICITY AND SAFETY

JEFFCOOL E100 coolant is not considered hazardous under ordinary conditions of handling and use. However, oral intake must be avoided, since ethylene glycol is the main component of JEFFCOOL E100 coolant. Human experience indicates that serious injury or death may result from the swallowing of as little as two fluid ounces of ethylene glycol, and ingestion of excessive amounts of ethylene glycol has produced birth defects in rodents.

JEFFCOOL E100 coolant is slightly irritating to skin and eyes. When contact occurs, eyes should be flushed thoroughly with water for at least 15 minutes; if irritation or discomfort develops or persists, a physician should be consulted. Splashes on the skin should be washed off promptly.

The vapor pressure of JEFFCOOL E100 coolant at room temperature is quite low, so there is no appreciable inhalation hazard at ordinary temperatures. However, precautions must be observed to prevent breathing of mist, spray, or fumes generated by excessive heat, since this could lead to absorption of toxic quantities of these materials.

A Material Safety Data Sheet for JEFFCOOL E100 coolant is available on request from Huntsman Corporation.

SHIPPING INFORMATION

JEFFCOOL E100 coolant is available in tank wagons and 55-gallon, nonreturnable steel drums. Bulk and drum inventory is available at select locations throughout the U.S. Contact your local Huntsman Sales Representative for details.

TECHNICAL SERVICE

We maintain a technical service staff at our laboratories in The Woodlands, TX, to assist you in the use of JEFFCOOL coolant products. Additionally, several of our authorized JEFFCOOL product Master Distributors are staffed to provide technical assistance with JEFFCOOL coolants.

JEFFCOOL® E100N Heavy Duty Stationary Engine Coolant

JEFFCOOL® E100N COOLANT

DESCRIPTION

JEFFCOOL E100N coolant is an inhibited ethylene glycol used as a heavy duty stationary engine industrial coolant. The inhibitor system is designed to protect brass, copper, solder, steel, cast iron, aluminum, and other metals commonly found in industrial stationary engine systems. A foam inhibitor is included to minimize foaming tendencies during service.

The effectiveness of JEFFCOOL E100N coolant in preventing corrosion has been proven in extensive laboratory simulated service and in actual service tests.

CAUTION: JEFFCOOL E100N coolant must not be used where contact with food or potable water is possible.

TYPICAL PROPERTIES		Test Method
Appearance	Slightly hazy and free of suspended solids.	
Color	Blue	
Density, 60°F, lb/gal	9.43	D-1122
Water, wt%	4.0	D-1123
Specific gravity, 60/60°F	1.135	D-1122
Reserve alkalinity, ml	12.0	D-1121
pH, 33% solution	10.0	D-1287
Freezing point, 50% vol., °F(°C)	-34(-37)	D-1177
Equilibrium boiling point 50 vol. % aqueous solution, °F	228	D-1120
Chloride Ion, ppm	25 max.	D-5827-95
Nitrite, ppm	3500 min.	D-5827-95

APPLICATIONS

Stationary Engines

JEFFCOOL E100N coolant is recommended as a coolant for stationary engines in applications such as natural gas processing, irrigation, power generating systems, oilfield operations, and portable air compressors. JEFFCOOL E100N is specially formulated to provide protection of cylinder liners from cavitation corrosion. JEFFCOOL E100N coolant protects the cooling systems from freezing in winter, overheating in summer, and corrosion in all seasons. The reduction in internal corrosion significantly improves heat transfer and lowers overall maintenance costs. Use in engines containing aluminum cylinder heads is not recommended.

JEFFCOOL E100N has been tested by the ASTM D1384 corrosion test and found to pass by ASTM D3306, D4985, and D5345.

JEFFCOOL E100N is fully compatible with other water/glycol products designed for similar applications.

JEFFCOOL E100N is now accepted for use in all heavy duty engines under these brand names:

- Ajax
- Caterpillar
- Cooper Bessemer
- Dresser-Rand
- Enterprise
- Superior
- Waukesha

JEFFCOOL® E100N Heavy Duty Stationary Engine Coolant *Continued*

HANDLING AND STORAGE

JEFFCOOL E100N coolant may be stored in unlined carbon steel tanks and drums. If storage of undiluted JEFFCOOL E100N coolant for periods exceeding 12 months is desired, it is recommended that the storage vessels be constructed from aluminum, stainless steel, or lined carbon steel. Vinyl, epoxy, and phenolic linings are suitable. Amercoat®-23 and Amercoat®-75 linings have been found satisfactory. Stocks of JEFFCOOL E100N coolant should be rotated every two to three years, if possible.

Undiluted JEFFCOOL E100N coolant may freeze where ambient temperatures fall below 0°F. Freezing points of various aqueous solutions of JEFFCOOL E100N coolant are shown in Figure 1. Freezing will not harm JEFFCOOL E100N coolant; however, when the temperature of undiluted JEFFCOOL E100N coolant is below 40°F, the viscosity will be such that pumping and transfer will be difficult. In areas where these conditions exist, it is recommended that storage vessels be equipped with stainless steel heating coils. Diluted JEFFCOOL E100N coolant is easily pumped under normally encountered temperatures.

The normal precautions associated with any chemical should be observed in handling JEFFCOOL E100N coolant, although it is neither explosive nor flammable under normal storage conditions. The ethylene glycol in JEFFCOOL E100N coolant is toxic if taken internally. Splashes onto eyes or skin must be washed away quickly and medical treatment is advised for eye exposure. Breathing of the vapors or mists should be avoided. For additional information, see the Toxicity section.

PREPARATION OF THE COOLING SYSTEM

Before JEFFCOOL E100N coolant is added to a new cooling system, the system should be washed and

thoroughly flushed with water. This will remove pipe scale, welding slag, dirt, and other impurities.

Existing systems that are being filled with JEFFCOOL E100N coolant should be thoroughly cleaned to improve heat transfer characteristics and prevent contamination of the coolant. Regardless of the cleaning agent used, the system must be thoroughly flushed with water before the JEFFCOOL E100N coolant is added. Cleaning agents used should be handled in strict accordance with instructions furnished by their suppliers.

Whenever an existing system is cleaned, a few leaks may be discovered. The presence of the proper maintenance people and equipment during cleaning will result in a much smoother operation.

INSTALLATION OF JEFFCOOL E100N COOLANT

Dilution of JEFFCOOL E100N coolant with water is necessary to obtain proper freeze protection. This should be done prior to installation. Topping-off of cooling systems should be done with a pre-diluted JEFFCOOL solution at the required system concentration.

SYSTEM DILUTION CONCENTRATIONS

The freezing protection offered by specific concentrations of JEFFCOOL E100N coolant is shown in Figure 1. It is recommended that a safety margin of at least 5°F be maintained for the lowest temperature anticipated. For example, a system with a 1,000-gallon capacity should be filled with 470 gallons of JEFFCOOL E100N coolant and 530 gallons of water if a solution freezing point of -20°F is desired. To ensure adequate corrosion protection, concentration less than 25% by volume of JEFFCOOL should not be used.

DILUTION WATER SPECIFICATIONS

The use of hard water in JEFFCOOL E100N coolant solutions should be avoided. Hard water contains calcium and magnesium ions which deposit scale in the system and could also cause precipitation of a portion of the inhibitor system. Softened water is not recommended because the water softening process may add chlorides and sulfates which may contribute to system corrosion. Where poor water conditions exist, distilled, deionized, or boiler condensate water should be used. If a suitable water source is not available, pre-diluted JEFFCOOL formulas are available from a Huntsman authorized distributor.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

SYSTEM MAINTENANCE PROGRAM

Huntsman Corporation, in conjunction with our authorized JEFFCOOL distributors, provides a comprehensive system maintenance program, including a product analysis service to assure that JEFFCOOL E100N coolant in customer systems maintains the proper inhibitor level and desired freeze protection. Once the system is in operation, it is recommended that samples of solution be taken at least once a year. The solution should be circulated for 30 minutes prior to sampling to ensure a representative sample.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures. Analytical results from the samples will be forwarded to customers.

REINHIBITING PROCEDURE

Occasionally, after prolonged or severe service, a solution of JEFFCOOL E100N coolant may need to be reinhibited. The need for reinhibition will be detected during the periodic analysis program and a recommended procedure will be included with the analytical results.

JEFFCOOL supplemental coolant additives (SCA-N) are available in five gallon and 55 gallon drum quantities from your JEFFCOOL representatives. The components of JEFFCOOL SCA-N replenish critical inhibitors required to provide continued protection.

Additives used in inhibiting JEFFCOOL E100N coolant should be handled in strict accordance with instructions furnished by their suppliers.

TOXICITY AND SAFETY

JEFFCOOL E100N coolant is not considered hazardous under ordinary conditions of handling and use. However, oral intake must be avoided, since ethylene glycol is the main component of JEFFCOOL E100N coolant. Human experience indicates that serious injury or death may result from the swallowing of as little as two fluid ounces of ethylene glycol, and ingestion of excessive amounts of ethylene glycol has produced birth defects in rodents.

JEFFCOOL® E100N Heavy Duty Stationary Engine Coolant *Continued*

JEFFCOOL E100N coolant is slightly irritating to skin and eyes. When contact occurs, eyes should be flushed thoroughly with water for at least 15 minutes; if irritation or discomfort develops or persists, a physician should be consulted. Splashes on the skin should be washed off promptly.

The vapor pressure of JEFFCOOL E100N coolant at room temperature is quite low, so there is no appreciable inhalation hazard at ordinary temperatures. However, precautions must be observed to prevent breathing of mist, spray, or fumes generated by excessive heat, since this could lead to absorption of toxic quantities of these materials.

A Material Safety Data Sheet for JEFFCOOL E100N coolant is available on request from Huntsman Corporation.

SHIPPING INFORMATION

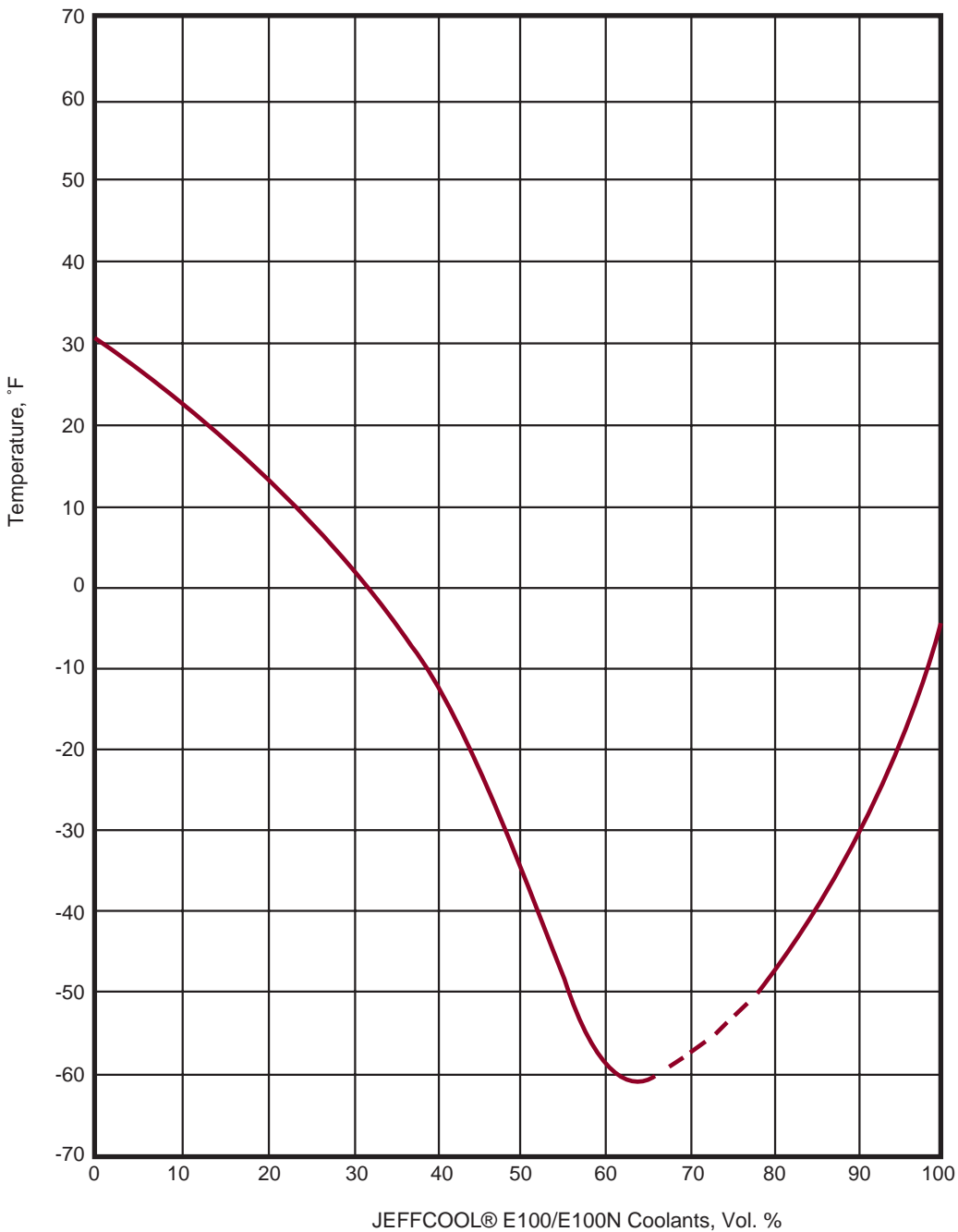
JEFFCOOL E100N coolant is available in tank wagons and 55-gallon, nonreturnable steel drums. Bulk and drum inventory is available at select locations throughout the U.S. Contact your local Huntsman Sales Representative for details.

TECHNICAL SERVICE

We maintain a technical service staff at our laboratories in The Woodlands, TX, to assist you in the use of JEFFCOOL coolant products. Additionally, several of our authorized JEFFCOOL brand product Master Distributors are staffed to provide technical assistance with JEFFCOOL coolants.

Physical Properties

FIGURE 1
Freezing Points of Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants



Physical Properties *Continued*

FIGURE 2
Specific Gravities at 60/60°F of Aqueous Solutions of
JEFFCOOL® E100 & E100N Coolants

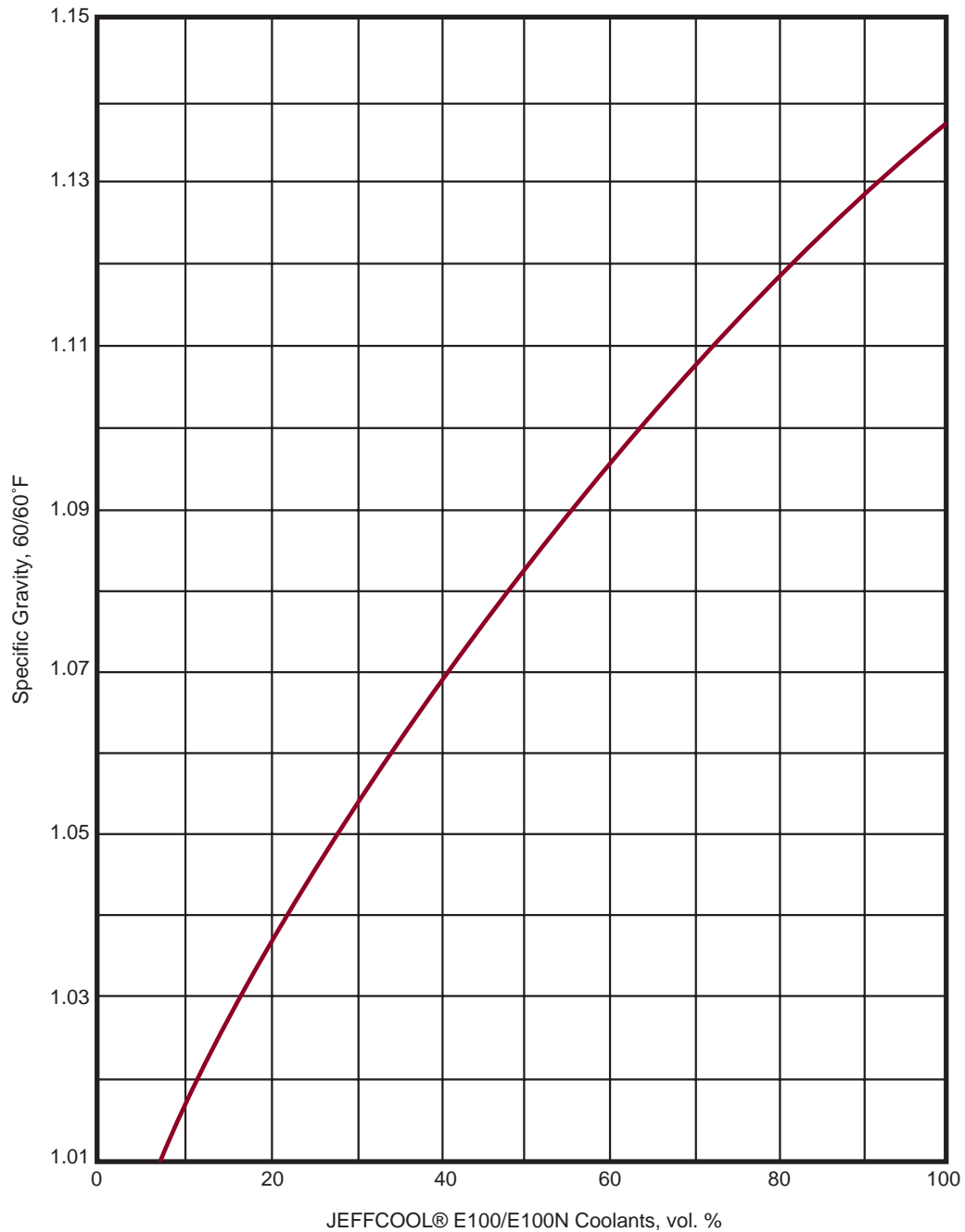
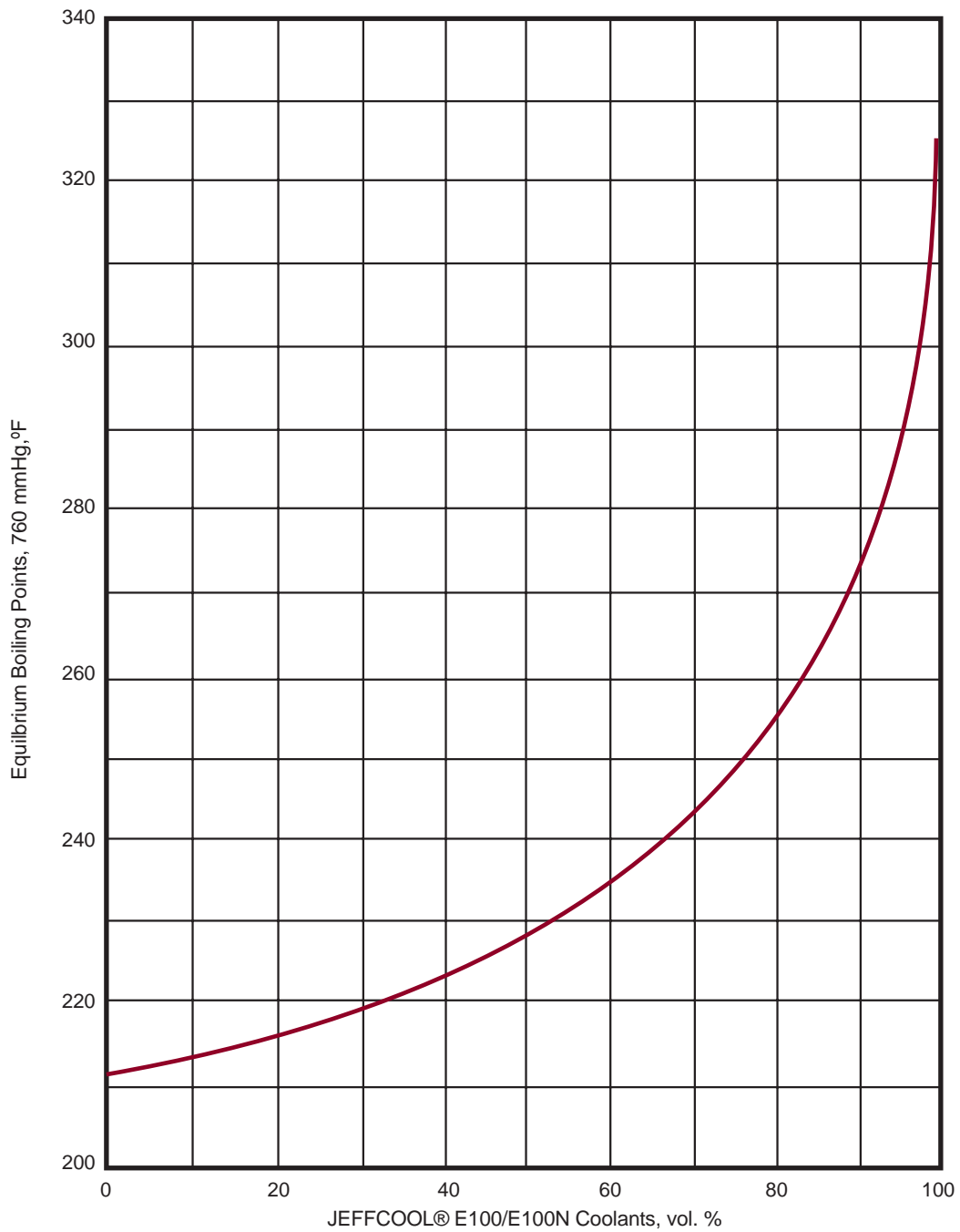


FIGURE 3
Equilibrium Boiling Points of Aqueous Solutions of
JEFFCOOL® E100 & E100N Coolants



Physical Properties *Continued*

FIGURE 4
Refractive Index of Aqueous Solutions of
JEFFCOOL® E100 & E100N Coolants

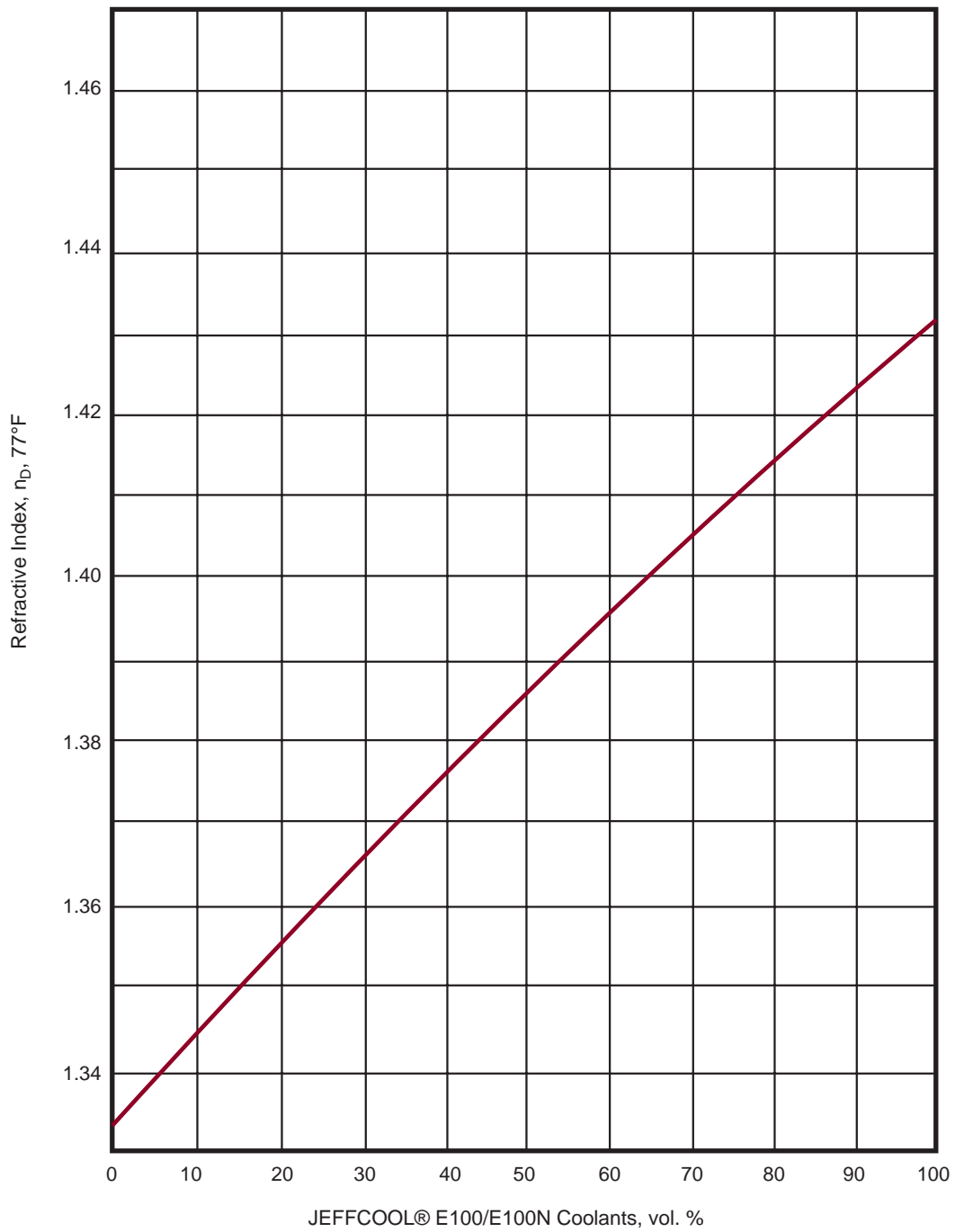
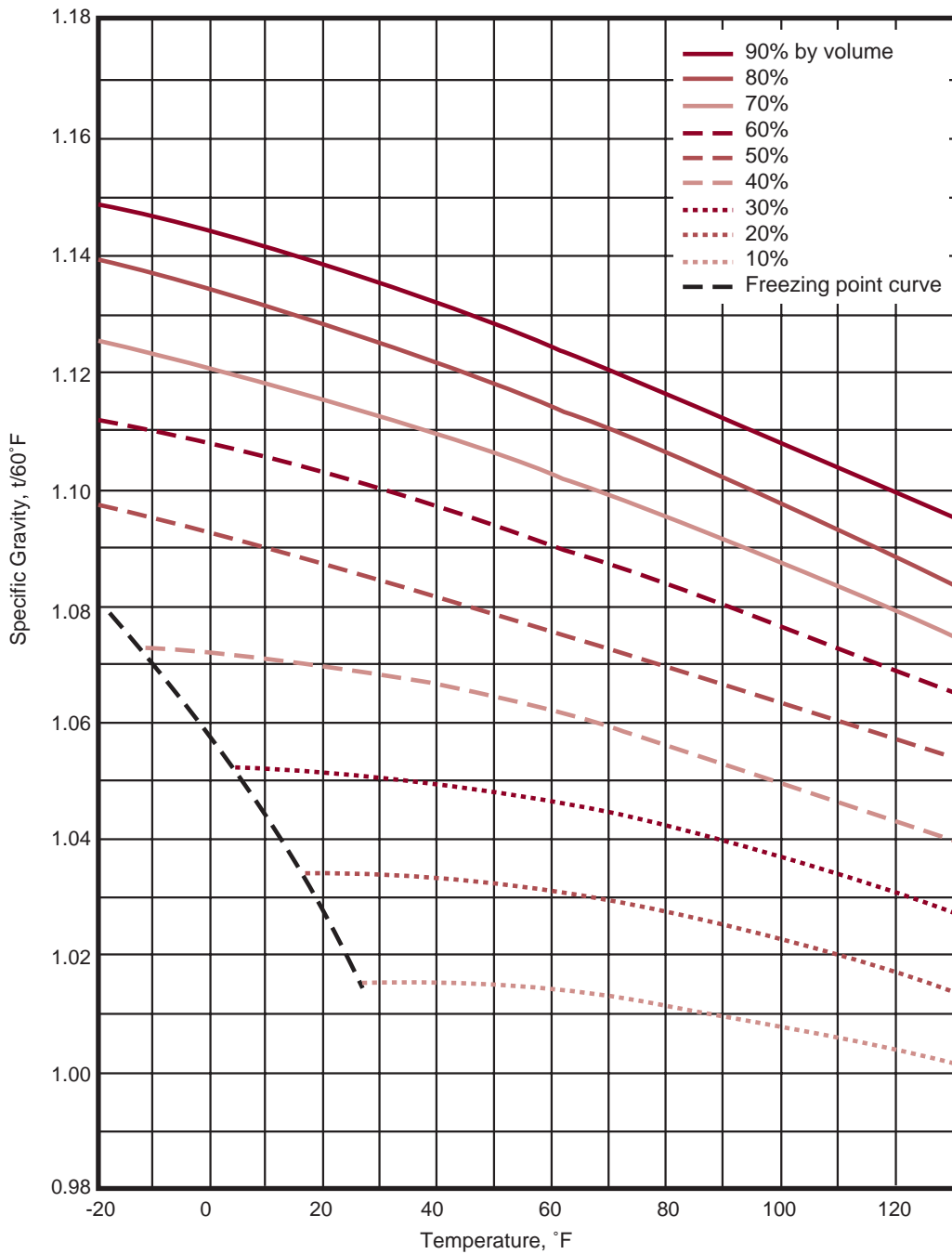


FIGURE 5
Specific Gravities of Aqueous Solutions of
JEFFCOOL® E100 & E100N Coolants



Physical Properties *Continued*

FIGURE 6
Viscosities of Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants

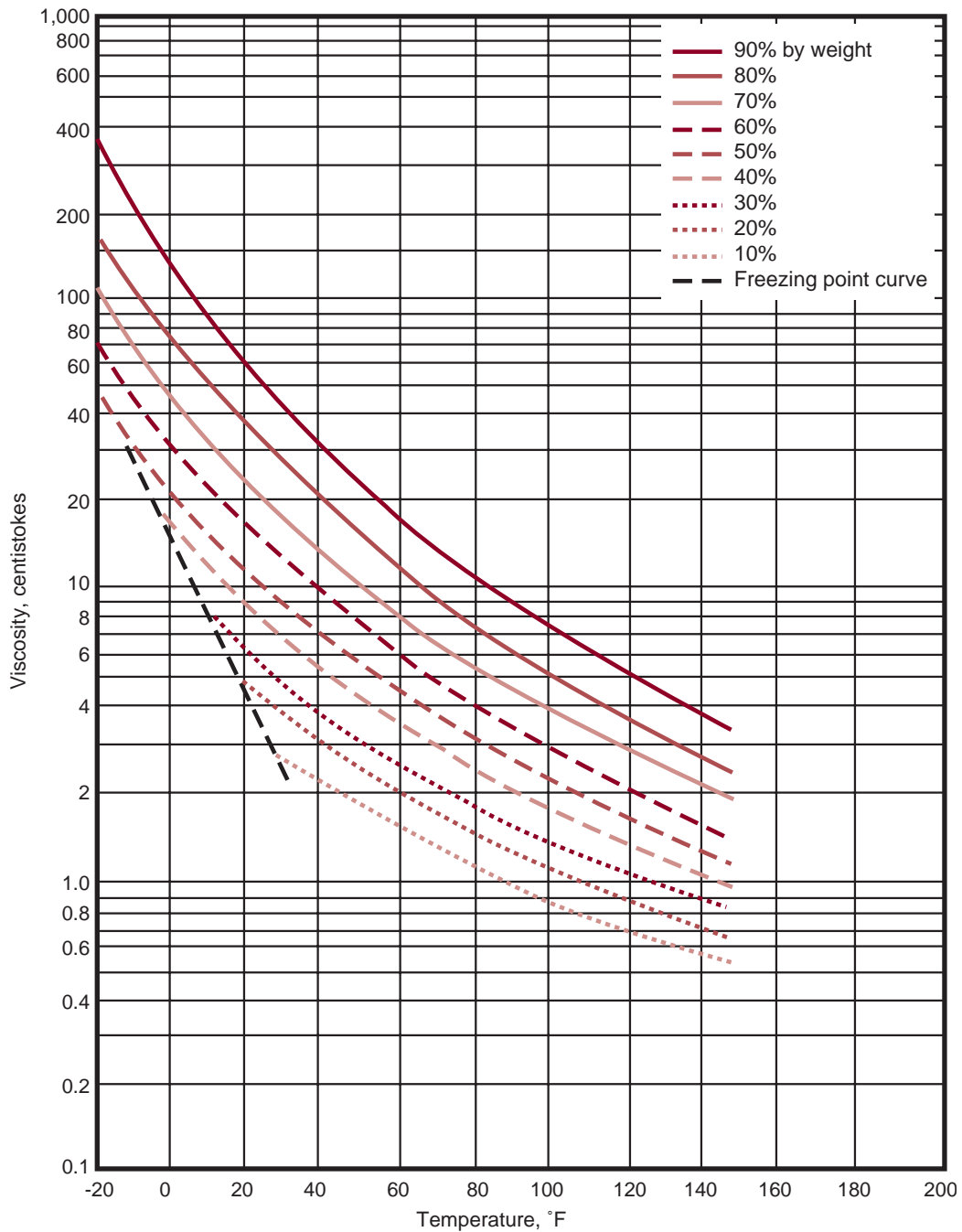
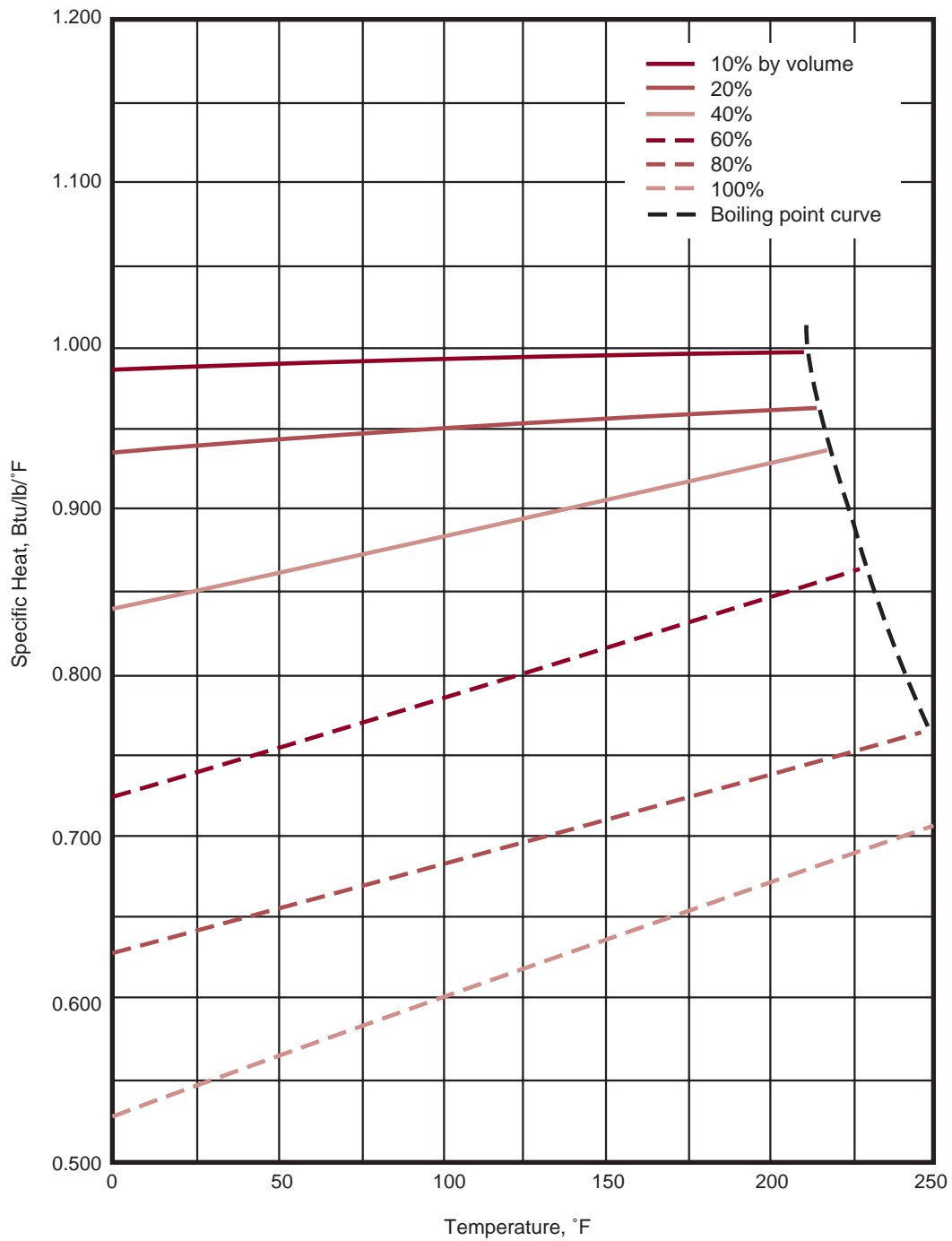


FIGURE 7
Specific Heats of Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants



Physical Properties *Continued*

FIGURE 8
Thermal Conductivities of Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants

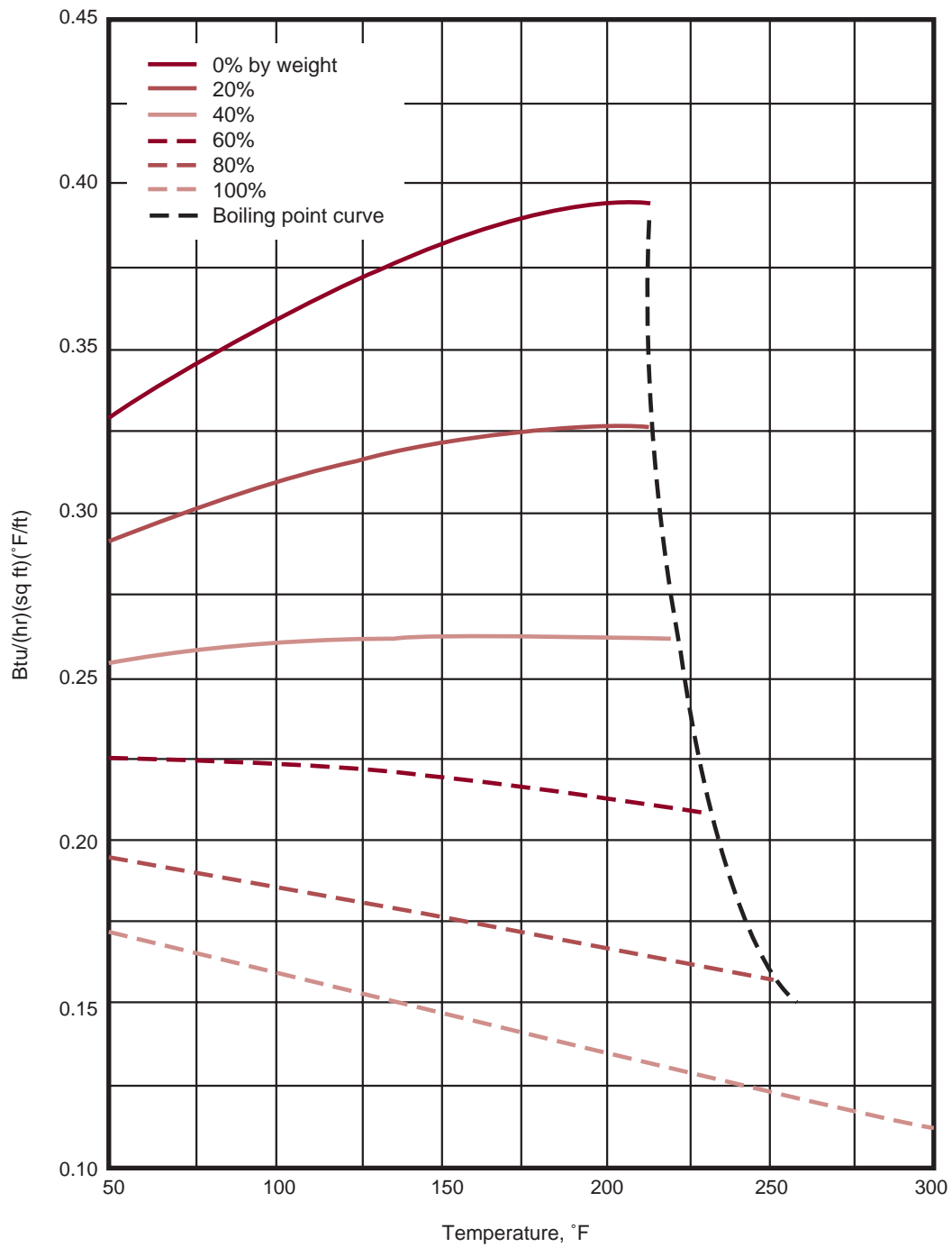
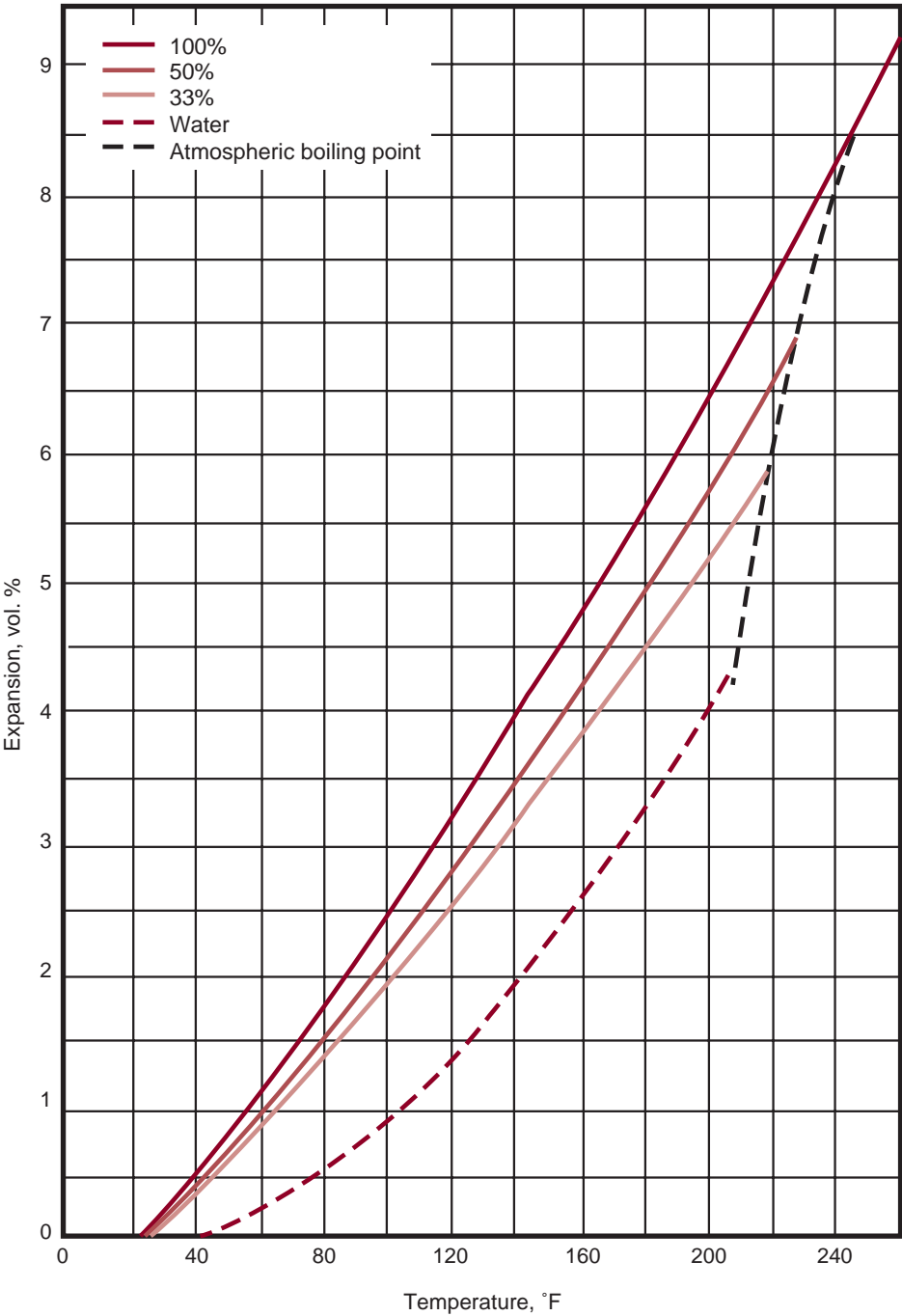
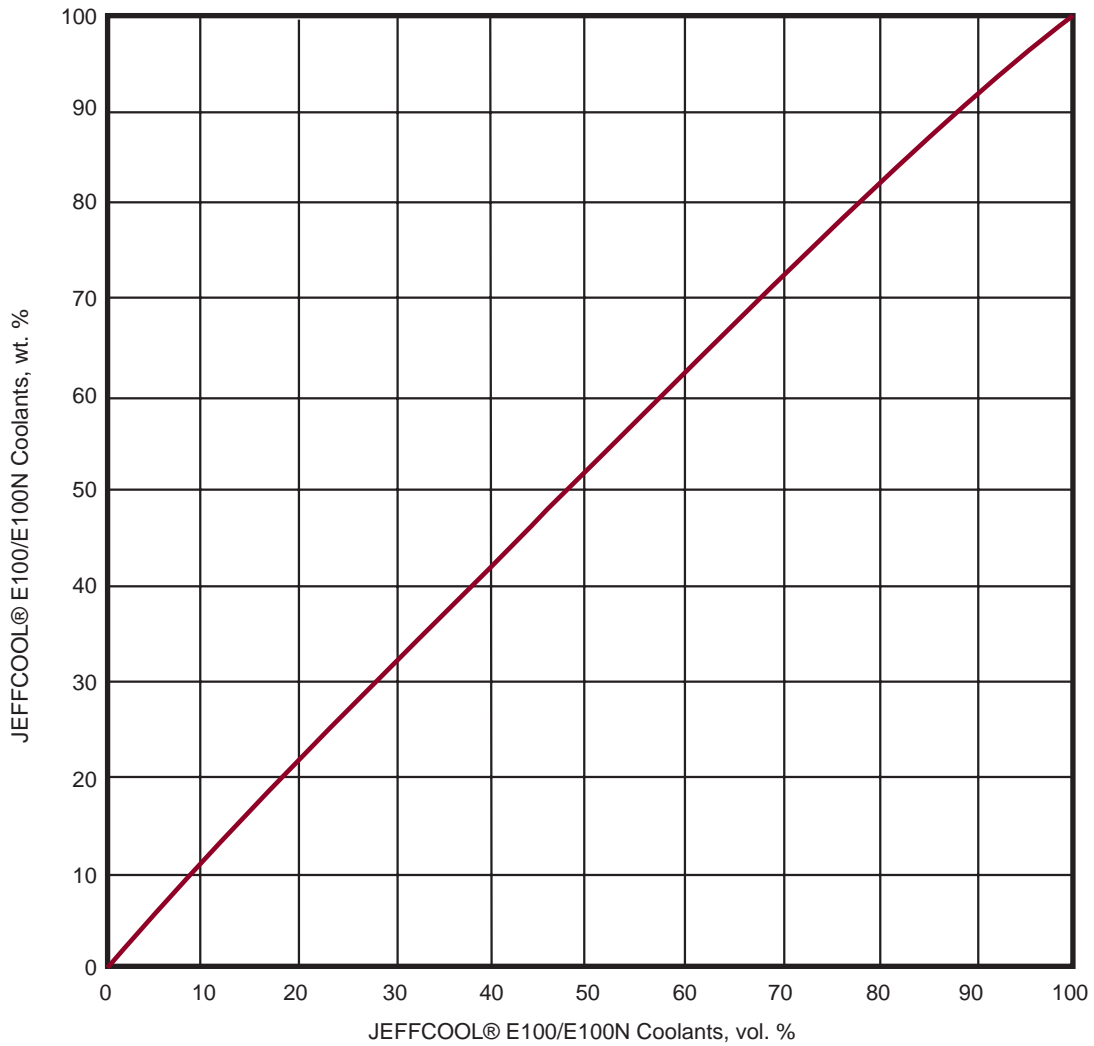


FIGURE 9
Thermal Expansion of Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants



Physical Properties *Continued*

FIGURE 10
Conversion Chart for Aqueous Solutions of JEFFCOOL® E100 & E100N Coolants



JEFFCOOL® P150 Industrial Coolant and Heat Transfer Fluid

JEFFCOOL® P150 COOLANT

DESCRIPTION APPLICATIONS

JEFFCOOL P150 coolant is an inhibited propylene glycol based industrial coolant and heat transfer agent. It is a slightly hazy liquid, free of suspended solids with a slight odor.

TYPICAL PROPERTIES		Test Method
Specific gravity, 60/60°F	1.055	D-1122
Reserve alkalinity, ml	12.0	D-1121
pH, 33% solution	10.0	D-1287
Foaming tendency, vol., ml Break time, sec	150 30	D-1881
Freezing point, 50 vol. % solution, °F 50 vol. % solution, °C	-30 -34	D-1177
Water, wt. %	4.0	D-1123
Color	Red to match standard	
Appearance	Slightly hazy and free of suspended solids	
Ash, wt. %	2.0	D-1119
Density, 60°F, lb/gal	8.8	D-1122
Flash point, COC, °F	225	D-92
Boiling point 50 vol. % solution, °F	222	D-1120
Solubility in water	Complete	

APPLICATIONS

Since JEFFCOOL P150 coolant is formulated with propylene glycol, it is especially suitable for applications in which toxicological and environmental considerations are critical.

JEFFCOOL P150 coolant is compatible and completely interchangeable with systems currently utilizing ethylene glycol based coolants.

JEFFCOOL P150 coolant protects cooling systems from freezing in winter, overheating in summer, and corrosion in all seasons. Improved heat transfer and less internal corrosion contributes significantly to overall operating and maintenance costs. JEFFCOOL P150 coolant is recommended as a heat transfer fluid for line heaters, snow melting systems for loading ramps, walkways, highways, and airfield runways, and as a coolant in ice rinks. The corrosion protection provided by JEFFCOOL P150 coolant and its low toxicity level as compared to other heat transfer fluids makes it an ideal transfer medium for heating, ventilation, and air conditioning (HVAC) systems as well as solar energy collection systems.

JEFFCOOL® P150 Industrial Coolant and Heat Transfer Fluid *Continued*

Thermal Energy Storage, Heating and Cooling Systems

JEFFCOOL P150 coolant is recommended as a heat transfer fluid in combination heating and cooling systems for large buildings. The excellent corrosion protection afforded by JEFFCOOL P150 coolant prolongs the life of the piping in these systems. JEFFCOOL P150 coolant is also an excellent heat transfer medium for solar energy collection systems.

Other Industry Applications

- Automotive and aircraft manufacturers
- Chemical manufacturers
- Dye and dye intermediate producers
- Electric power companies
- Ice skating rinks
- Paint, varnish, and lacquer companies
- Paper and paper product companies
- Plastics and synthetic resin manufacturers
- Textile chemical manufacturers

HANDLING AND STORAGE

JEFFCOOL P150 coolant may be stored in unlined carbon steel tanks and drums. If storage of concentrated JEFFCOOL P150 coolant for periods over 12 months is desired, it is recommended that the storage vessels be

constructed from aluminum, stainless steel, or lined carbon steel. Vinyl, epoxy, and phenolic linings are suitable. Amercoat®-23 and Amercoat®-75 linings have been found to be satisfactory.

JEFFCOOL P150 coolant in undiluted form will not freeze at ambient temperatures. Freezing will not harm JEFFCOOL P150 coolant, but when the temperature of undiluted JEFFCOOL P150 coolant is below 30°F, the viscosity will be such that pumping and transfer will be difficult. In areas where these conditions exist, it is recommended that storage vessels be equipped with stainless steel heating coils.

Diluted JEFFCOOL P150 coolant is easily pumped under normally expected temperatures. However, at temperatures below -20°F, special pumping equipment may be necessary.

The normal precautions associated with any chemical should be observed in handling JEFFCOOL P150 coolant. This product is neither explosive nor flammable under normal storage conditions. The propylene glycol in this product is considered practically nontoxic. Splashes onto eyes or skin however, must be washed away quickly and medical treatment is advised for eye exposure. Breathing of the vapors or mists should be avoided.

INSTALLATION OF JEFFCOOL P150 COOLANT

Dilution of JEFFCOOL P150 coolant with water is necessary to obtain proper freeze protection. This should be done prior to installation. Topping-off of cooling systems should be done with pre-diluted JEFFCOOL coolant solutions at the required system concentration.

DILUTION WATER SPECIFICATIONS

The use of hard water in JEFFCOOL P150 coolant solutions should be avoided. Hard water contains calcium and magnesium ions which deposit scale in the system and could also cause precipitation of a portion of the inhibitor system. When hard water conditions exist, distilled, deionized, or boiler condensate water should be used if at all possible. If a suitable water source is not available, pre-diluted JEFFCOOL product formulas are available from a Huntsman authorized distributor.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

SYSTEM MAINTENANCE PROGRAM

Huntsman Corporation, in conjunction with our authorized JEFFCOOL brand product distributors, provides a comprehensive system maintenance program, including a product analysis service to assure that JEFFCOOL P150 coolant in customer systems maintains the proper inhibitor level and desired freeze protection. Once the system is in operation, it is recommended that samples of solution be taken at least once a year. The solution should be circulated for 30 minutes prior to sampling to ensure a representative sample.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures. Analytical results from the samples will be forwarded to customers.

REINHIBITING PROCEDURE

Occasionally, after prolonged or severe service, a solution of JEFFCOOL P150 coolant may need to be reinhibited. The need for reinhibition will be detected during the periodic analysis program and a recommended procedure will be included with the analytical results.

JEFFCOOL supplemental coolant additives (SCA) are available in five gallon and 55-gallon drum quantities from your JEFFCOOL brand product representatives. The components of JEFFCOOL SCA replenish critical inhibitors required to provide continued protection.

Additives used in inhibiting JEFFCOOL P150 coolant should be handled in strict accordance with instructions furnished by their suppliers.

TOXICITY AND SAFETY

JEFFCOOL P150 coolant is not considered hazardous under ordinary conditions of handling and use. Propylene glycol, which is the main component of this product, is considered practically nontoxic. JEFFCOOL P150 coolant is only minimally irritating to skin and eyes, but as with any chemical, unnecessary contact with these body parts is to be avoided.

JEFFCOOL® P150 Industrial Coolant and Heat Transfer Fluid

Continued

A Material Safety Data Sheet for JEFFCOOL P150 coolant is available on request.

SHIPPING INFORMATION

JEFFCOOL P150 coolant is available in tank wagons and 55-gallon, nonreturnable steel drums. Bulk and drum inventory is available at select locations throughout the U.S. Contact your local Huntsman Sales Representative for details.

TECHNICAL SERVICE

We maintain a technical service staff at our laboratories in The Woodlands, TX, to assist you in the use of JEFFCOOL coolant products. Additionally, several of our authorized JEFFCOOL brand product Master Distributors are staffed to provide technical assistance with JEFFCOOL coolants.

JEFFCOOL P150N Heavy Duty Stationary Engine Coolant

JEFFCOOL® P150N COOLANT

DESCRIPTION

JEFFCOOL P150N coolant is an inhibited propylene glycol used as a heavy duty stationary engine industrial coolant. The inhibitor system is designed to protect brass, copper, solder, steel, cast iron, aluminum, and other metals commonly found in industrial stationary engine systems. A foam inhibitor is included to minimize foaming tendencies during service.

The effectiveness of JEFFCOOL P150N coolant in preventing corrosion has been proven in extensive laboratory simulated service and in actual service tests.

TYPICAL PROPERTIES		Test Method
Appearance	Slightly hazy and free of suspended solids.	
Color	Blue	
Water, wt%	5.0	D-1123
Specific gravity, 60/60°F	1.055	D-1122
Reserve alkalinity, ml	12.0	D-1121
pH, 33% solution	10.0	D-1287
Freezing point, 50% vol., °F(°C)	-30(-34)	D-1177
Equilibrium boiling point 50 vol. % solution, °F	222	D-1120
Chloride Ion, ppm	25 max.	D-5827-95
Nitrite, ppm	3500 min.	D-5827-95

APPLICATIONS

Stationary Engines

JEFFCOOL P150N coolant is recommended as a coolant for stationary engines in applications such as natural gas processing, irrigation, power generating systems, oilfield operations, and portable air compressors. JEFFCOOL P150N is specially formulated to provide protection of cylinder liners from cavitation corrosion. JEFFCOOL P150N coolant protects the cooling systems from freezing in winter, overheating in summer, and corrosion in all seasons. The reduction in internal corrosion significantly improves heat transfer and lowers overall maintenance costs. Use in engines containing aluminum cylinder heads is not recommended.

JEFFCOOL P150N has been tested by the ASTM D1384 corrosion test and found to pass by ASTM D5216.

JEFFCOOL P150N is now accepted for use in all heavy duty engines under these brand names:

- Ajax
- Caterpillar
- Cooper Bessemer
- Dresser-Rand
- Enterprise
- Superior
- Waukesha

JEFFCOOL P150N Heavy Duty Stationary Engine Coolant *Continued*

HANDLING AND STORAGE

JEFFCOOL P150N coolant may be stored in unlined carbon steel tanks and drums. If storage of concentrated JEFFCOOL P150N coolant for periods over 12 months is desired, it is recommended that the storage vessels be constructed from aluminum, stainless steel, or lined carbon steel. Vinyl, epoxy, and phenolic linings are suitable. Amercoat®-23 and Amercoat®-75 linings have been found to be satisfactory.

JEFFCOOL P150N coolant in undiluted form will not freeze at ambient temperatures. Freezing will not harm JEFFCOOL P150N coolant, but when the temperature of undiluted JEFFCOOL P150N coolant is below 30°F, the viscosity will be such that pumping and transfer will be difficult. In areas where these conditions exist, it is recommended that storage vessels be equipped with stainless steel heating coils.

Diluted JEFFCOOL P150N coolant is easily pumped under normally expected temperatures. However, at temperatures below -20°F, special pumping equipment may be necessary. The normal precautions associated with any chemical should be observed in handling JEFFCOOL P150N coolant. This product is neither explosive nor flammable under normal storage conditions. The propylene glycol in this product is considered practically nontoxic. Splashes onto eyes or skin, however, must be washed away quickly and medical treatment is advised for eye exposure. Breathing of the vapors or mists should be avoided.

INSTALLATION OF JEFFCOOL P150N COOLANT

Dilution of JEFFCOOL P150N coolant with water is necessary to obtain proper freeze protection. This should be done prior to installation. Topping-off of cooling sys-

tems should be done with pre-diluted JEFFCOOL solutions at the required system concentration.

DILUTION WATER SPECIFICATIONS

The use of hard water in JEFFCOOL P150N coolant solutions should be avoided. Hard water contains calcium and magnesium ions which deposit scale in the system and could also cause precipitation of a portion of the inhibitor system. When hard water conditions exist, distilled, deionized, or boiler condensate water should be used if at all possible. If a suitable water source is not available, pre-diluted JEFFCOOL formulas are available from a Huntsman authorized distributor.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

SYSTEM MAINTENANCE PROGRAM

Huntsman Corporation, in conjunction with our authorized JEFFCOOL distributors, provides a comprehensive system maintenance program, including a product analysis service to assure that JEFFCOOL P150N coolant in customer systems maintains the proper inhibitor level and desired freeze protection. Once the system is in operation, it is recommended that samples of solution be taken at least once a year. The solution should be circulated for 30 minutes prior to sampling to ensure a representative sample.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures. Analytical results from the samples will be forwarded to customers.

REINHIBITING PROCEDURE

Occasionally, after prolonged or severe service, a solution of JEFFCOOL P150N coolant may need to be reinhibited. The need for reinhibition will be detected during the periodic analysis program and a recommended procedure will be included with the analytical results.

JEFFCOOL supplemental coolant additives (SCA-N) are available in five gallon and 55-gallon drum quantities from your JEFFCOOL brand product representatives. The components of JEFFCOOL SCA-N replenish critical inhibitors required to provide continued protection.

Additives used in inhibiting JEFFCOOL P150N coolant should be handled in strict accordance with instructions furnished by their suppliers.

TOXICITY AND SAFETY

JEFFCOOL P150N coolant is not considered hazardous under ordinary conditions of handling and use.

Propylene glycol, which is the main component of this product, is considered practically nontoxic. JEFFCOOL P150N coolant is only minimally irritating to skin and eyes, but as with any chemical, unnecessary contact with these body parts is to be avoided. A Material Safety Data Sheet for JEFFCOOL P150N coolant is available on request.

SHIPPING INFORMATION

JEFFCOOL P150N coolant is available in tank wagons and 55-gallon, nonreturnable steel drums. Bulk and drum inventory is available at select locations throughout the U.S. Contact your local Huntsman Sales Representative for details.

TECHNICAL SERVICE

We maintain a technical service staff at our laboratories in The Woodlands, TX, to assist you in the use of JEFFCOOL coolant products. Additionally, several of our authorized JEFFCOOL brand product Master Distributors are staffed to provide technical assistance with JEFFCOOL coolants.

JEFFCOOL® P200 Coolant and Heat Transfer Fluid

JEFFCOOL® P200 COOLANT

DESCRIPTION

JEFFCOOL P200 coolant is an inhibited U.S.P. grade propylene glycol that is used as an industrial coolant and heat transfer agent. It is intended for use where contact with food or potable water is possible and toxicological properties must be considered. All of the components in JEFFCOOL P200 are listed on the FDA GRAS (generally recognized as safe) list for chemicals to be used as direct/indirect food additives. The components in JEFFCOOL P200 coolant are covered under 21 CFR 184.1666 and 21 CFR 182.6285. The inhibitor system is designed to protect most metals commonly found in industrial cooling and heating systems. A foam inhibitor is included to minimize foaming tendencies during service.

Extensive laboratory simulated service tests and actual service tests have proven the effectiveness of JEFFCOOL P200 coolant in preventing corrosion. Use of JEFFCOOL P200 coolant for heat transfer applications in place of brine solutions or uninhibited glycol-water solutions lowers maintenance costs and improves heat transfer.

JEFFCOOL P200 is available with Kosher certification.

APPLICATIONS

Packaged Food Freezing

JEFFCOOL P200 coolant has been developed to meet the requirements for a heat transfer agent in spray and immersion freezing of packaged foods. These freezing processes provide a means of economically quick-freezing the outer layer of packaged foods before final freezing in a freezing room. The United States Department of Agriculture (USDA) has approved

TYPICAL PROPERTIES		Test Method
Ash, wt. %	2.0	D-1119
Color	Colorless	
Density, 60°F, lb/gal	8.8	D-1122
Flash point, COC, °F	225	D-92
Foaming tendency, vol., ml Break time, sec	150 max. 30 max.	D-1881
Freezing protection, °F 20 vol. % aqueous solution 30 vol. % aqueous solution 40 vol. % aqueous solution 50 vol. % aqueous solution	17 7 -7 -30	D-1177
pH, 50 vol. % aqueous solution	9.6	D-1287
Reserve alkalinity	12.0	D-1121
Specific gravity, 60/60°F	1.055	D-1122
Water, wt. %	2.5 max.	D-1123

JEFFCOOL P200 as a coolant and heat transfer fluid for use in immersion or spray freezing of packaged poultry or wrapped meat in official establishments operating under the federal meat and poultry products inspection program. JEFFCOOL P200 should be used in a manner which prevents direct or indirect contamination of edible products.

Defrosting Freezing Coils

Freezing tunnels are often utilized in the preparation of frozen foods. In the freezing tunnel, high-velocity air passes over cooling coils to chill the food. As the air passes over the coils, a layer of frost forms, which reduces the heat transfer efficiency of the system. To prevent frost formation, a cold, aqueous solution of JEFFCOOL P200 coolant is approved by the USDA for defrosting cooling coils where the exhaust air from the coils varies over a wide temperature range.

Beer Cooling

One of the most successful applications of JEFFCOOL P200 coolant is as a heat transfer medium for beer cooling in breweries. This product may be utilized to cool fermentation tanks, yeast storage tanks, and beer storage tanks.

The noncorrosiveness and low toxicity of JEFFCOOL P200 coolant offer many advantages over refrigerants such as brine, ammonia, water, or uninhibited propylene glycol. Small amounts of JEFFCOOL P200 coolant affect neither the yeast nor fermentation of the beer.

Other Industry Applications

- Beverage and flavoring companies
- Candy companies
- Canneries and preservers
- Dairy product companies
- Distilleries and breweries
- Meat processing and meat product companies
- Pharmaceutical producers
- Poultry processing plants
- Vegetable and animal oil processors

HANDLING AND STORAGE

JEFFCOOL P200 coolant may be stored in unlined carbon steel tanks and drums. If storage of concentrated JEFFCOOL P200 coolant for periods exceeding 12

months is desired, it is recommended that the storage vessels be constructed from aluminum, stainless steel, or lined carbon steel. Vinyl, epoxy, and phenolic linings are suitable. Amercoat®-23 and Amercoat®-75 linings have been found to be satisfactory.

JEFFCOOL P200 coolant in undiluted form will not freeze at ambient temperatures. Freezing points of various aqueous solutions of JEFFCOOL P200 coolant are shown in Figure 11.

Freezing will not harm JEFFCOOL P200 coolant, but when the temperature of undiluted JEFFCOOL P200 coolant is below 30°F, the viscosity will be such that pumping and transfer will be difficult. In areas where these conditions exist, it is recommended that storage vessels be equipped with stainless steel heating coils.

Diluted JEFFCOOL P200 coolant is easily pumped under normally expected temperatures. However, at temperatures below -20°F, special pumping equipment may be necessary.

The normal precautions associated with any chemical should be observed in handling JEFFCOOL P200 coolant. This product is neither explosive nor flammable under normal storage conditions. The propylene glycol in this product is considered practically nontoxic. Splashes onto eyes or skin however, must be washed away quickly and medical treatment is advised for eye exposure. Breathing of the vapors or mists should be avoided.

PREPARATION OF THE COOLING SYSTEM

Before JEFFCOOL P200 coolant is added to a new cooling system, the system should be washed and

JEFFCOOL® P200 Coolant and Heat Transfer Fluid *Continued*

thoroughly flushed with water. This will remove pipe scale, welding slag, dirt, and other impurities.

Existing systems that are being filled with JEFFCOOL P200 coolant should be thoroughly cleaned to improve heat transfer characteristics and prevent contamination of the solution. A dilute solution of inhibited muriatic acid may be circulated to remove severe scaling within the system. If scaling is not excessive, a solution of either sulfamic acid or a chelating agent, such as EDTA or sodium gluconate, may be used for cleaning. Regardless of the cleaning agent used, the system must be thoroughly flushed with clean water before the JEFFCOOL P200 coolant is added. Cleaning agents used should be handled in strict accordance with instructions furnished by the supplier.

Whenever an existing system is cleaned, a few leaks will probably be discovered. The presence of the proper maintenance people and equipment during cleaning will result in a much smoother operation.

INSTALLATION OF JEFFCOOL P200 COOLANT

Dilution of JEFFCOOL P200 coolant with water is necessary to obtain proper freeze protection.

The freezing protection offered by specific concentrations of JEFFCOOL P200 coolant can be found in Figure 11. It is recommended that a safety margin of 5°F be maintained for the lowest temperature anticipated. For example, a system with a capacity of 1,000 gallons should be filled with 470 gallons of JEFFCOOL P200 coolant and 530 gallons of water if a solution freezing point of -20°F is desired.

DILUTION WATER SPECIFICATIONS

The use of hard water in JEFFCOOL P200 coolant solutions should be avoided. Hard water contains calcium and magnesium ions which deposit scale in the system and could also cause precipitation of a portion of the inhibitor system. When hard water conditions exist, distilled, deionized, or boiler condensate water should be used if at all possible. If a suitable water source is not available, pre-diluted JEFFCOOL formulas are available from a Huntsman authorized distributor.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

SYSTEM MAINTENANCE PROGRAM

To assure that the JEFFCOOL P200 coolant in a customer's system is maintaining the proper inhibitor level and desired freeze protection, Huntsman provides a product analysis service without charge.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL

products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures. Analyses will be performed on samples after initial filling and at periodic intervals of at least once per year.

TOXICITY AND SAFETY

JEFFCOOL P200 coolant is not considered hazardous under ordinary conditions of handling and use. Propylene glycol, which is the main component of this product, is considered practically nontoxic. JEFFCOOL P200 coolant is only minimally irritating to skin and eyes but, as with any chemical, unnecessary contact with these body parts is to be avoided. All of the components in JEFFCOOL P200 are listed on the FDA GRAS (generally recognized as safe) list for chemicals to be used as direct/indirect food additives. The components in P200 are covered under 21 CFR 184.1666 and 21 CFR 182.6285. The United States Department of Agriculture (USDA) has approved JEFFCOOL P200 as a coolant and heat transfer fluid for use in immersion or spray freezing of packaged poultry or wrapped meat in

official establishments operating under the federal meat and poultry products inspection program. JEFFCOOL P200 should be used in a manner which prevents direct or indirect contamination of edible products.

A Material Safety Data Sheet for JEFFCOOL P200 coolant is available on request.

SHIPPING INFORMATION

JEFFCOOL P200 coolant is available in tank wagons and 55-gallon, nonreturnable steel drums. Bulk and drum inventory of JEFFCOOL P200 coolant are available at select locations throughout the country. Contact your local Huntsman Sales Representative for details.

TECHNICAL SERVICE

We maintain a technical service staff at our laboratories in The Woodlands, TX, to assist you in the use of JEFFCOOL coolant products. Additionally, several of our authorized JEFFCOOL Master Distributors are staffed to provide technical assistance with JEFFCOOL coolants.

Physical Properties

FIGURE 11
Freezing Points of Aqueous Solutions of JEFFCOOL® P150, P150N & P200 Coolants

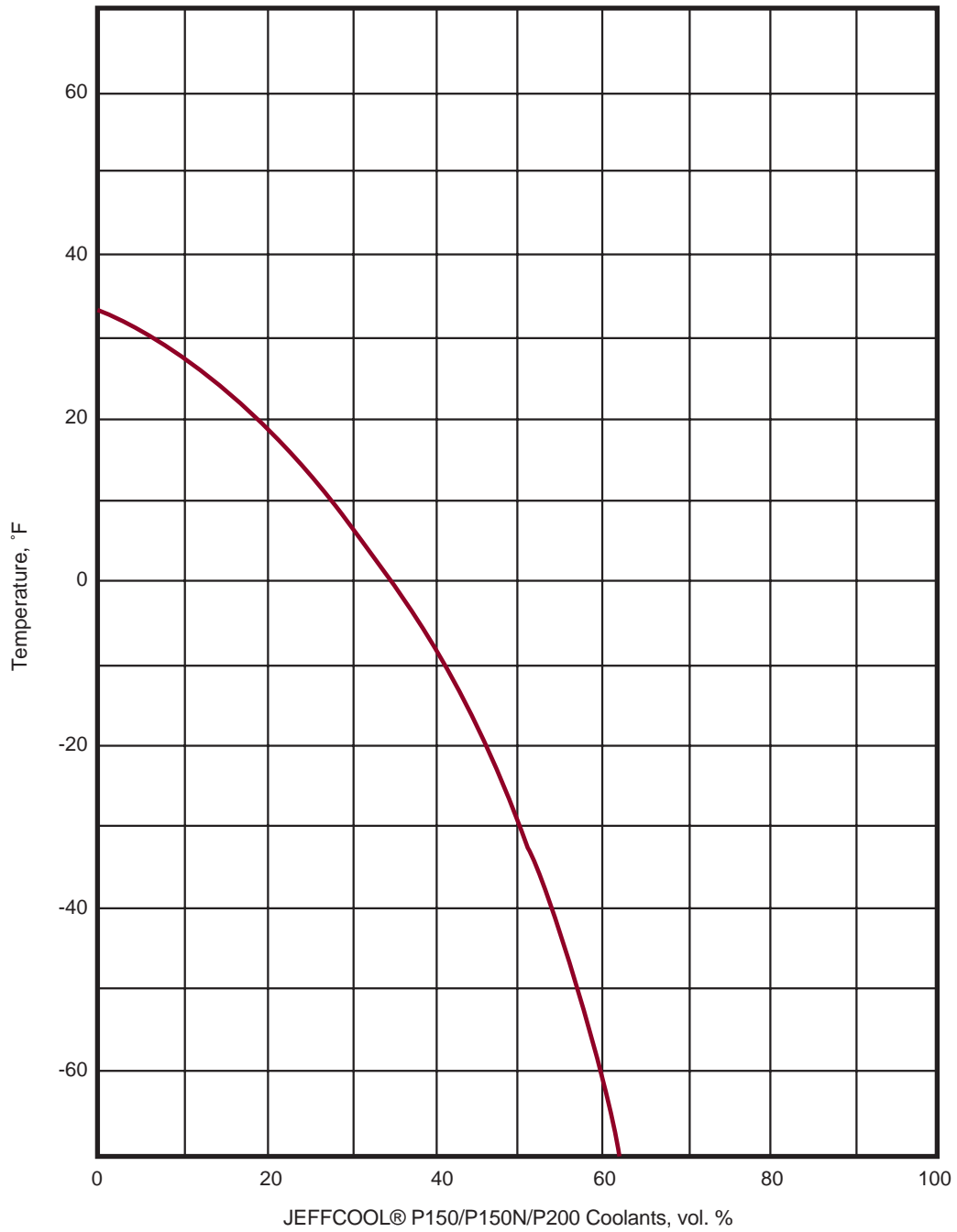
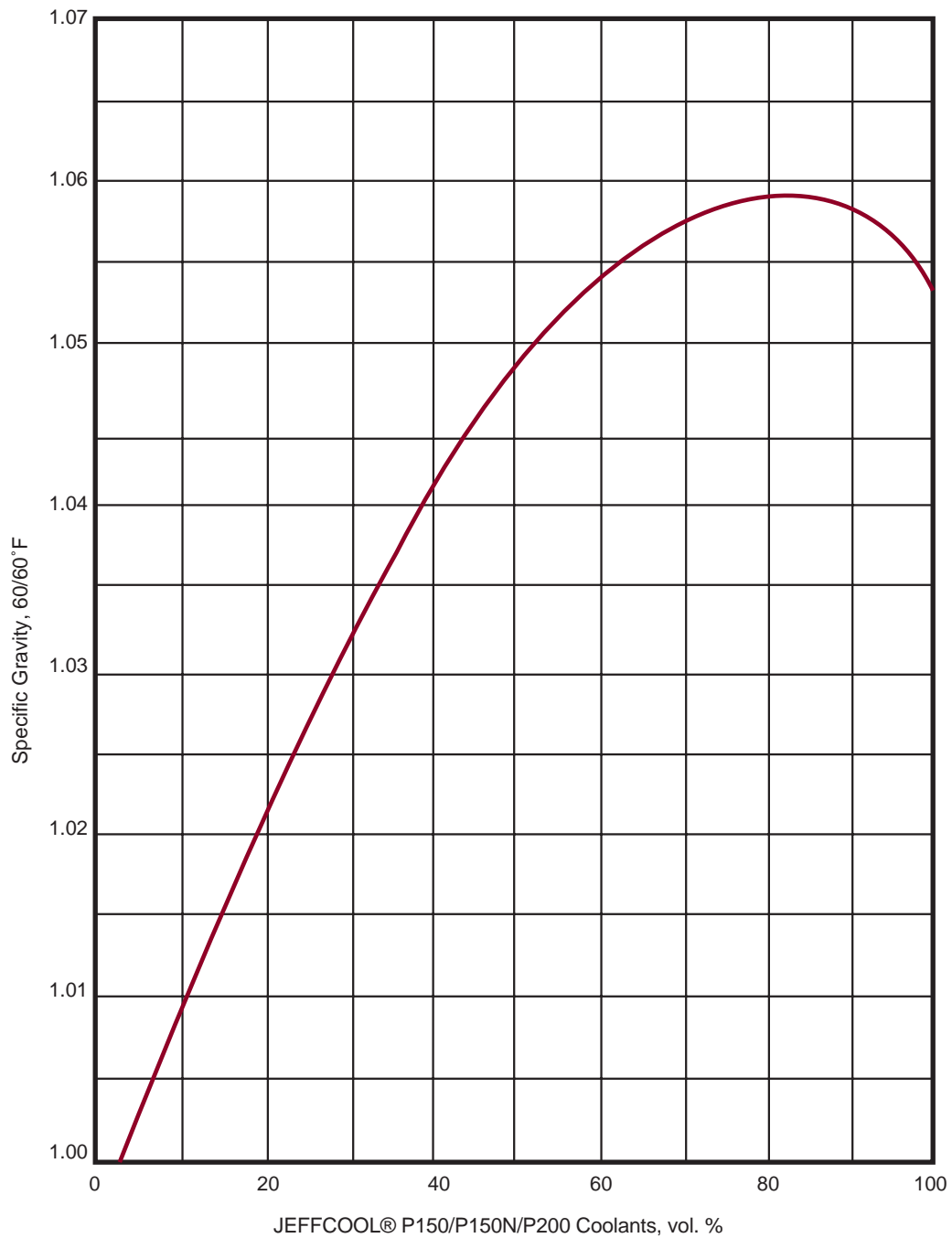


FIGURE 12
Specific Gravities at 60/60°F of Aqueous Solutions of
JEFFCOOL® P150, P150N, & P200 Coolants



Physical Properties *Continued*

FIGURE 13
Specific Gravities of Aqueous Solutions of
JEFFCOOL® P150, P150N & P200 Coolants

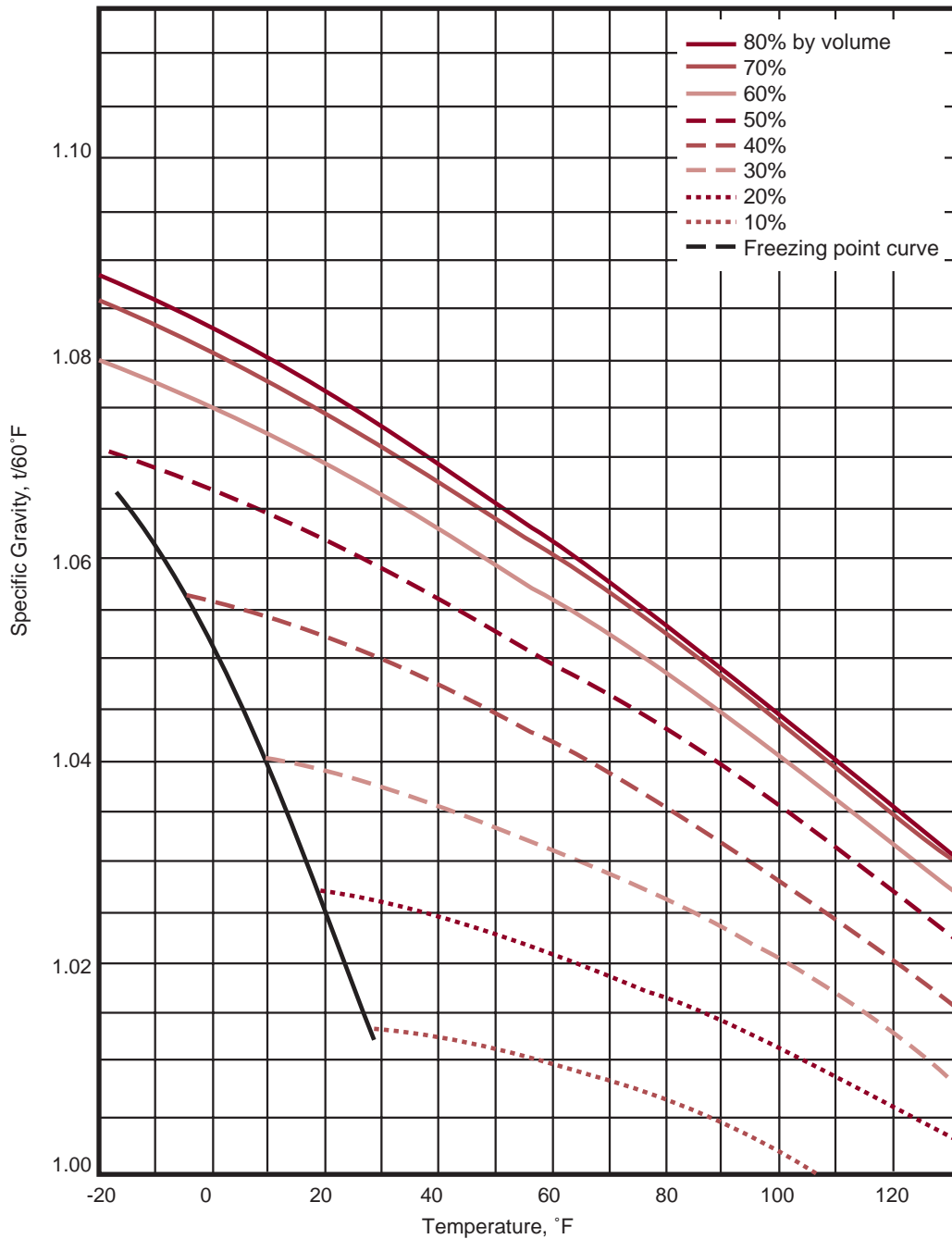
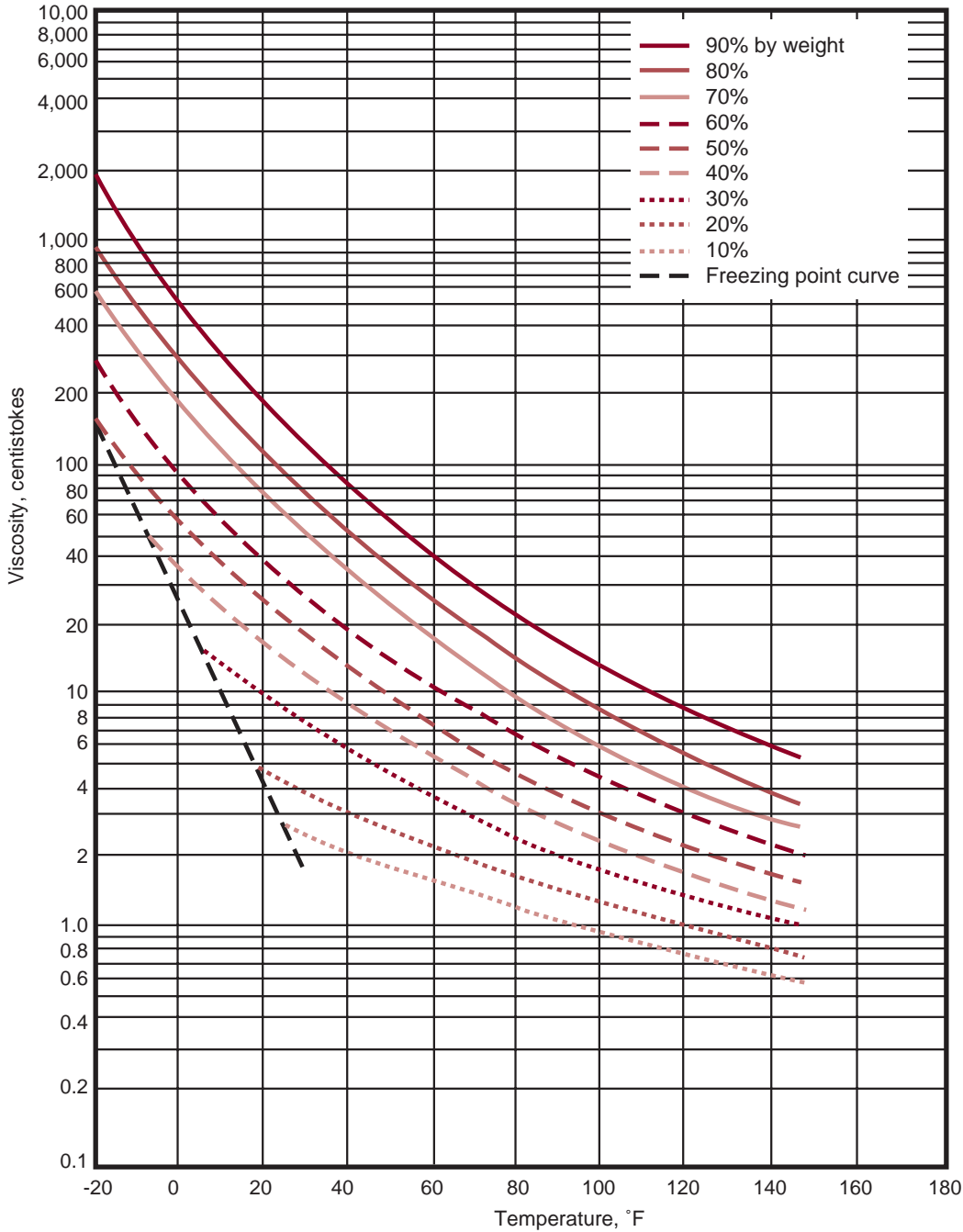


FIGURE 14
Viscosities of Aqueous Solutions of JEFFCOOL® P150, P150N & P200 Coolants



Physical Properties *Continued*

FIGURE 15
Specific Heats of Aqueous Solutions of JEFFCOOL® P150, P150N & P200 Coolants

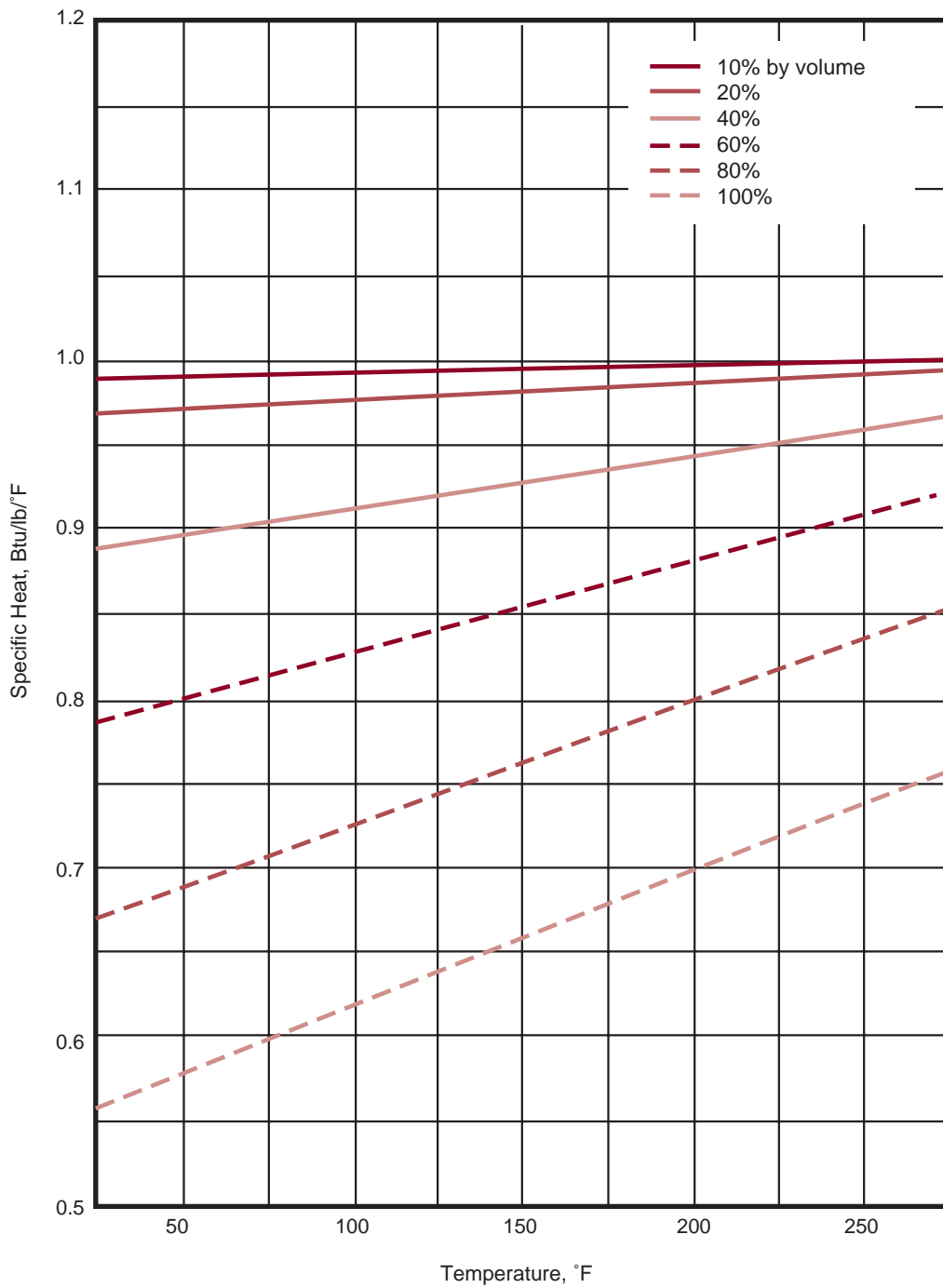
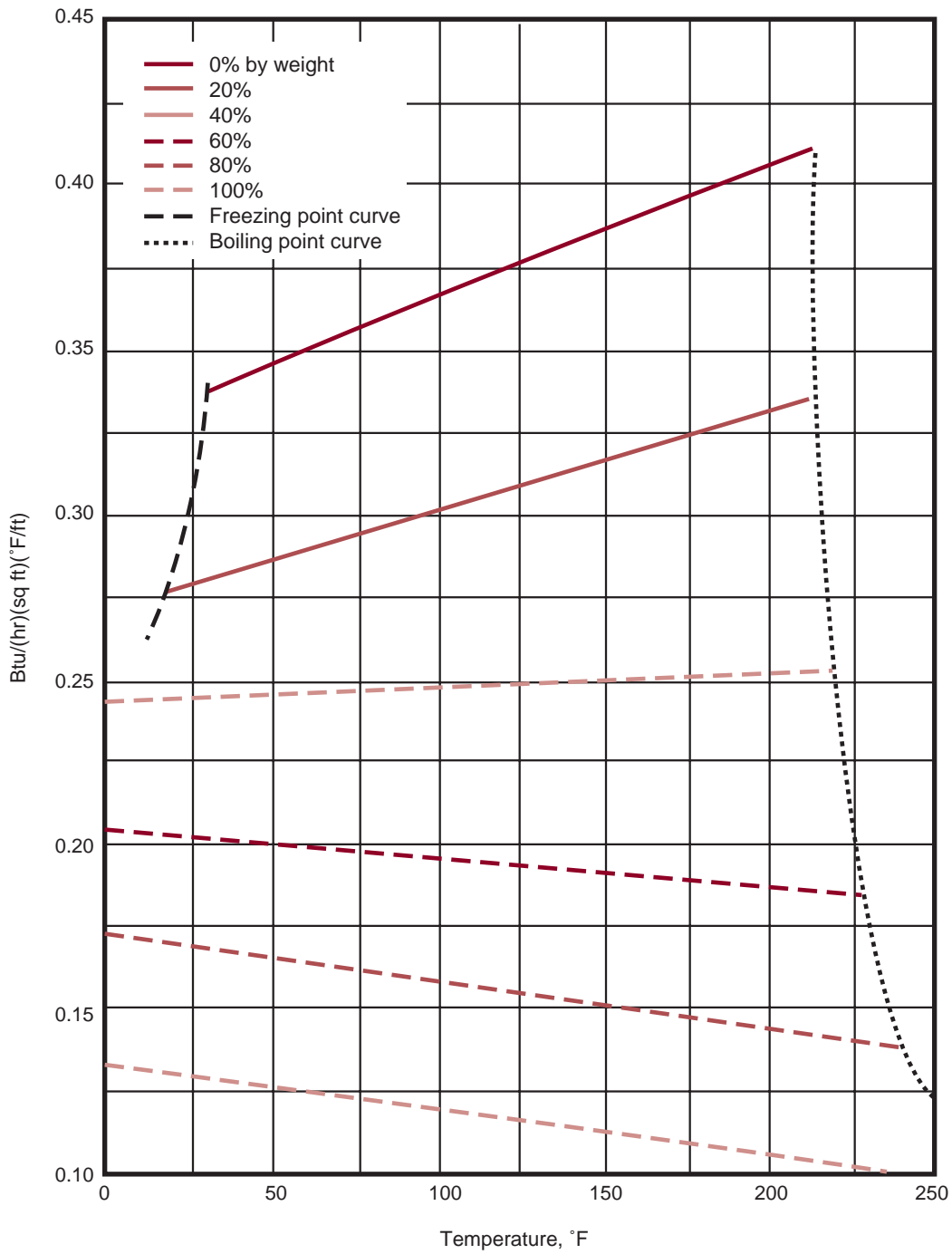
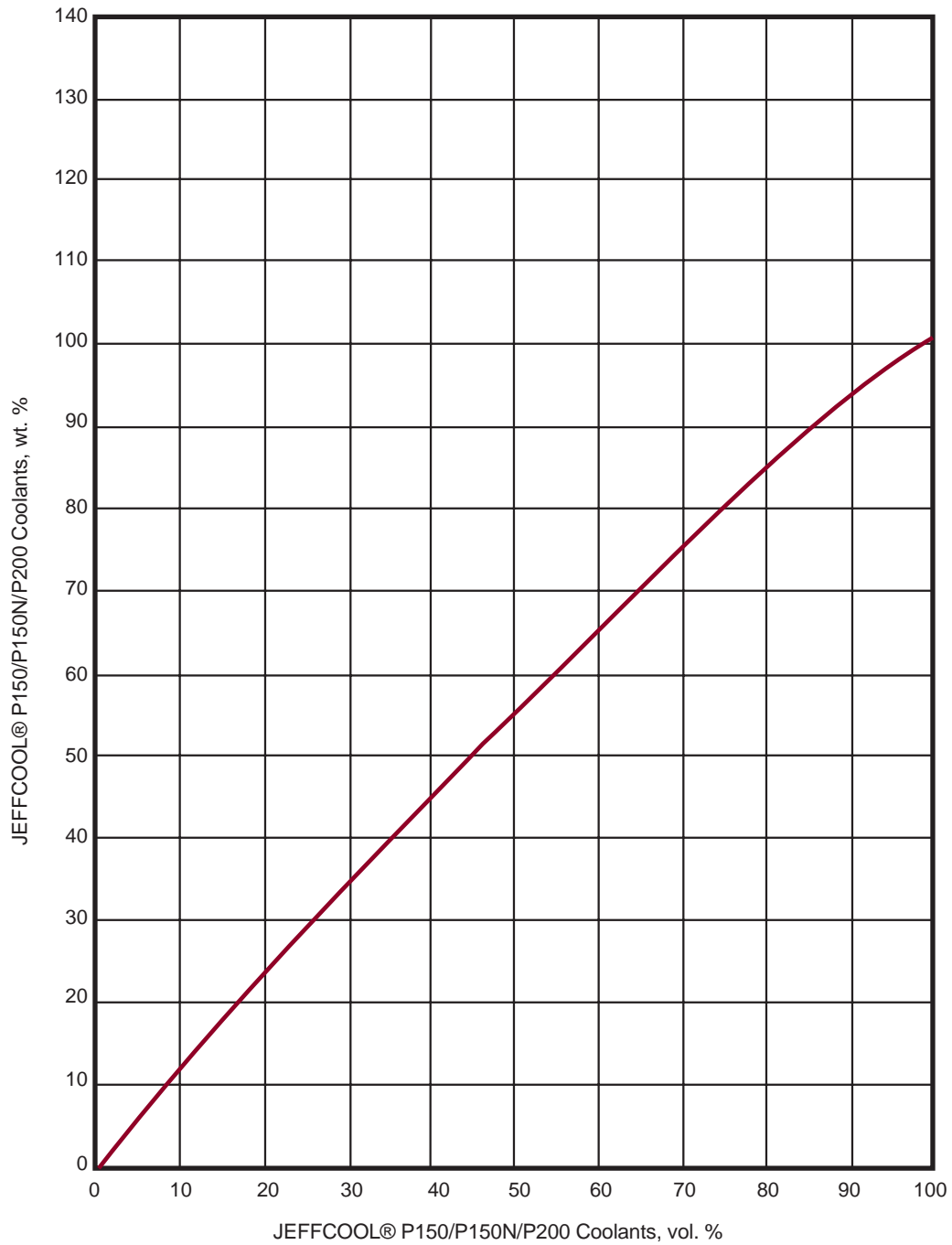


FIGURE 16
Thermal Conductivities of Aqueous Solutions of
JEFFCOOL® P150, P150N & P200 Coolants



Physical Properties *Continued*

FIGURE 17
Conversion Chart for Aqueous Solutions of
JEFFCOOL® P150, P150N, & P200 Coolants



JEFFPROTEC™ H-1 FG FR Fluid

JEFFPROTEC™ H-1 FG FR FLUID

DESCRIPTION

JEFFPROTEC H-1 FG FR fluid is an ISO 46 grade, Kosher approved, water hydraulic fluid, which meets the requirements for FDA Specification 21 CFR 178.3510 lubricants with incidental food contact, Subpart F, Food Additive Amendment to the Federal Food, Drug and Cosmetic Act. It is listed as an H-1 lubricant by the USDA for use in Federally inspected meat and poultry plants where incidental food contact may occur and is qualified by Factory Mutual as a Group 1 (HF-C) less flammable fluid.

APPLICATIONS

JEFFPROTEC H-1 FG FR fluid is primarily used in food processing applications requiring a product that is fire retardant, food grade and possesses low temperature flow properties. Because of its low toxicological properties and -58 °F pour point JEFFPROTEC H-1 FG FR fluid may find applications where environmental and safety considerations are an issue such as a hydraulic medium in commercial and industrial equipment in waterways, mining, drilling, forestry, logging and cold weather conditions.

HANDLING AND STORAGE

Hydraulic systems using JEFFPROTEC H-1 FG FR fluid should not exceed temperatures of 140 °F or constant operation temperatures of 120 °F on this product or any water glycol fluids, as recommended by the National

Fluid Power Association, Incorporated. JEFFPROTEC H-1 FG FR fluid is compatible with most seal and hose materials, however caution must be exercised with materials that soften and swell in the presence of water. Questions concerning compatibility with similar products should be discussed with your Huntsman representative. Please follow the recommendations of pump and equipment manufacturers when using any water glycol fluids.

TYPICAL PROPERTIES	
Ash, wt. %	2.0
Color	Clear to Amber
Density, 60°F, lb/gal	8.8
Flash point, COC, °F	225
Freezing protection, °F	< -10°F
pH	9.0
Specific gravity, 60/60°F	1.061
Water, wt. %	41

Service programs include training of personnel, evaluation of hydraulic fluid systems and a free fluid analysis program to maintain product integrity. The product is available in 55-gallon nonreturnable drums, 275-gallon totes and bulk. The properties above are typical specifications. Users should evaluate this product for its suitability in each particular application. This product may become toxic if contaminated and require special precautions in handling and disposal, consult with your local government agencies when applicable.

JEFFCOOL® Supplemental Coolant Additive Products

JEFFCOOL® SCA GENERIC NAMES

JEFFCOOL® Supplemental Coolant Additive

DESCRIPTION

JEFFCOOL SCA is a concentrated inhibitor package specifically for the Huntsman JEFFCOOL E100 and P150 series of industrial coolants and heat transfer fluids. It is dyed red in color to match the Huntsman standard and is slightly hazy and free of suspended solids.

APPLICATIONS

- supplemental coolant additive
- corrosion inhibitor

JEFFCOOL SCA is intended to be added to Huntsman's JEFFCOOL E100 (ethylene glycol based) and/or JEFFCOOL P150 (propylene glycol based) Coolants. When used as recommended by Huntsman's JEFFCOOL analytical service, the components of JEFFCOOL SCA can extend the useful life of coolant systems by replenishing critical inhibitors required to provide corrosion protection. Manufacturer's recommendations and instructions must be followed to achieve optimum product performance.

SALES SPECIFICATIONS

Property	Specifications	Test Method*
Appearance	Slightly hazy and substantially free of suspended solids.	ST-0061
Color	Red to match standard	
Specific Gravity, 60°F (15.6°C)	1.03 min. 1.07 max.	D-1122
Reserve Alkalinity	32 min. 42 max.	D-1121
pH, as is	9.0 min. 10.5 max.	D-1287
Chloride Ion, ppm	100 max.	D-5827-95
*Methods of Test are available upon request.		

JEFFCOOL® SCA-N GENERIC NAMES

JEFFCOOL® Supplemental Coolant Additive -N series

DESCRIPTION

JEFFCOOL SCA-N is a concentrated inhibitor package for the Huntsman JEFFCOOL N series industrial coolants and heat transfer fluids. It is dyed blue in color to match the Huntsman standard and is slightly hazy and free of suspended solids.

APPLICATIONS

- supplemental coolant additive
- corrosion inhibitor

JEFFCOOL SCA-N is intended to be added to Huntsman's JEFFCOOL E100N (ethylene glycol based) and/or JEFFCOOL P150N (propylene glycol based) Coolants. When used as recommended by Huntsman's JEFFCOOL analytical service, the components of JEFFCOOL SCA-N can extend the useful life of coolant systems by replenishing critical inhibitors required to provide corrosion protection. Manufacturer's recommendations and instructions must be followed to achieve optimum product performance.

SALES SPECIFICATIONS

Property	Specifications	Test Method*
Appearance	Slightly hazy and substantially free of suspended solids.	ST-0061
Color	Blue to match standard	
Specific Gravity, 60°F (15.6°C)	1.08 min. 1.12 max.	D-1122
Reserve Alkalinity	35 min. 45 max.	D-1121
pH, as is	9.0 min. 10.5 max.	D-1287
Chloride Ion, ppm	100 max.	D-5827-95
*Methods of Test are available upon request.		

USAGE Guidelines for JEFFCOOL® SCA and SCA-N Products

WHEN TO ADD THE JEFFCOOL SCA PRODUCT

The JEFFCOOL SCA should be added on an as-needed basis, determined by the concentrations of the inhibitors. The JEFFCOOL SCA or SCA-N should be added whenever any of the following conditions occur:

Phosphate drops below	1000 ppm
Tolytriazole drops below	100 ppm
Nitrite drops below	800 ppm (SCA-N only)

IDEAL TARGET CONCENTRATION AT 50%

Phosphate	5000 ppm
Tolytriazole	500 ppm
Nitrite	2000 ppm (SCA-N only)

For a cooling system which is completely uninhibited, whether a glycol/water mixture or just water, four quarts (one gallon) of JEFFCOOL SCA should be added per 10 gallons of cooling system volume.

For a system that specifies nitrite, limit the treatment to a maximum of two quarts of JEFFCOOL SCA-N per 10 gallons of cooling system volume, otherwise, overdose of nitrite will occur.

CONDEMNING LIMITS

The coolant should be drained and replaced with fresh fluid if any of the following occur:

Chloride greater than 200 ppm
pH less than 8.0 or greater than 11.0

Systems which require nitrite should use JEFFCOOL SCA-N product

CONDEMNING LIMITS FOR JEFFCOOL® PRODUCT SAMPLE ANALYSIS

Result	Value	Action
pH	<8 or >11	Replace Fluid
Chloride	>200 ppm	Replace Fluid
Water	>75%	Replace Fluid / Add JEFFCOOL® Concentrate
Water	<30%	Add Water
Tolytriazole	<100 ppm	Add JEFFCOOL® SCA or SCA-N
Phosphate	<1,000 ppm	Add JEFFCOOL® SCA or SCA-N
Nitrite	<800 ppm	Add JEFFCOOL® SCA-N

Guidelines for JEFFCOOL® P150N and E100N Products

Test	Acceptable Range	Action Levels	Action
pH	8.0 to 11.0	<8.0 or >11.0	Replace fluid
Nitrite	800 to 2999 ppm	<800 ppm	Add JEFFCOOL SCA-N (1qt per 10 gal system volume)
Nitrite	800 to 2999 ppm	>3000 ppm	Replace fluid or dilute

A pH of less than 8.0 or greater than 11.0 indicates that there is contamination or severe glycol degradation. It cannot be easily fixed, so the coolant should be replaced to avoid corrosion problems.

A nitrite concentration of at least 800 ppm is needed to protect against cavitation corrosion in heavy-duty engines. If the concentration gets over 3000 ppm (from too much JEFFCOOL SCA-N), it is corrosive to solder.

THE FREEZING POINT MAY BE LOWERED TO:			
Propylene Glycol Based Freeze Points For JEFFCOOL P150, P150N		Ethylene Glycol Based Freeze Points For JEFFCOOL E100, E100N	
20%	+10	30%	+1
30%	+8	35%	-5
35%	0	40%	-12
40%	-10	45%	-25
45%	-19	50%	-34
50%	-30	55%	-50
55%	-45	60%	-58
60%	-60		
65%	-70		

GUIDELINES FOR JEFFCOOL® P150 & E100 AL COOLANTS

In JEFFCOOL P150AL and E100 AL coolants, containing elevated levels of nitrite, nitrite and/or molybdate are the most appropriate “markers”. They can be checked quickly and with sufficient accuracy in the field with approved test strips or test kits. When these test methods indicate nitrite levels below 800-1000 ppm or molybdate levels below 300-400 ppm, it is then time to add JEFFCOOL SCA-AL for aluminum.

JEFFCOOL® AdPac-EP Product

GENERIC NAME

JEFFCOOL® AdPac-EP Concentrate

DESCRIPTION

JEFFCOOL AdPac-EP is a concentrated inhibitor for the Huntsman JEFFCOOL industrial coolants and heat transfer fluids.

APPLICATIONS

Manufacturing JEFFCOOL E100 and P150 Industrial Coolants

Corrosion inhibitor

JEFFCOOL AdPac-EP is used in the manufacturing of Huntsman's JEFFCOOL E100 (ethylene glycol based) and/or JEFFCOOL P150 (propylene glycol based) industrial coolants.

JEFFCOOL E100 and P150 coolants are accepted for use in heat transfer applications such as:

Line Heaters

Snow-Melting and Refrigeration Systems

Thermal Energy Storage, Heating and Cooling Systems

Other Industry Applications

- Automotive and aircraft manufacturers
- Chemical manufacturers
- Dye and dye intermediate producers
- Electric power companies
- Ice skating rinks
- Paint, varnish, and lacquer companies
- Paper and paper product companies
- Plastics and synthetic resin manufacturers
- Textile chemical manufacturers

SALES SPECIFICATIONS

Property	Specifications	Test Method*
Appearance	Slightly hazy and free of suspended solids.	ST-0061
Color	Undyed	
Water, wt%	45.0 min. 54.0 max.	D-1123
Specific Gravity, 60/60°F (15.6°C)	1.26 min. 1.32 max.	D-1122
Reserve Alkalinity, ml	190 min. 250 max.	D-1121
pH, undiluted 11.0 max.	9.5 min. D-1287	
Chloride Ion, ppm	300 max.	CST 38.17

* Methods of Test are available upon request.

TO MAKE JEFFCOOL E100 COOLANT FROM THE ADDITIVE PACKAGE:

COMPOSITION	% BY WEIGHT	% BY VOLUME
Ethylene Glycol (coolant grade)	93.0379	93.9408
JEFFCOOL AdPac-EP	6.94	6.035
JEFFCOOL AdPac-P **	0.02	0.02
Dye, Rhodamine WT Liquid	0.0021	0.0022

** JEFFCOOL AdPac-P must be used in conjunction with AdPac-N and AdPac-EP.

TO MAKE JEFFCOOL® P150 COOLANT FROM THE ADDITIVE PACKAGE:

COMPOSITION	% BY WEIGHT	% BY VOLUME
Propylene Glycol (coolant grade)	93.0379	94.3238
JEFFCOOL AdPac-EP	6.94	5.654
JEFFCOOL AdPac-P **	0.02	0.021
Dye, Rhodamine WT Liquid	0.0021	0.0022

** JEFFCOOL AdPac-P must be used in conjunction with AdPac-N and AdPac-EP.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

JEFFCOOL® AdPac-N Product

GENERIC NAME

JEFFCOOL® AdPac-N concentrate

DESCRIPTION

JEFFCOOL AdPac-N is a concentrated inhibitor package for the Huntsman JEFFCOOL N series industrial coolants and heat transfer fluids.

APPLICATIONS

- Manufacturing JEFFCOOL E100N and prediluted versions of JEFFCOOL P150N industrial coolants

- Corrosion inhibitor

JEFFCOOL AdPac-N is used in the manufacturing of Huntsman's JEFFCOOL E100N (ethylene glycol based) and/or JEFFCOOL P150N (propylene glycol bases) coolants.

JEFFCOOL E100N and P150N coolants are accepted for use in ALL heavy duty engines under the following brand names:

- Ajax
- Caterpillar
- Cooper Bessemer
- Dresser-Rand
- Enterprise
- Superior
- Waukesha

In addition, these JEFFCOOL coolants meet the performance requirements of ASTM D4985 and ASTM D5345.

JEFFCOOL E100N and P150N coolants are formulated to contain nitrite. These formulations can be used without a JEFFCOOL SCA Pre-Charge in engines that require nitrite to prevent cylinder liner cavitation corrosion, as specified by the engine manufacturer.

SALES SPECIFICATIONS

Property	Specifications	Test Method*
Appearance	Slightly hazy and substantially free of suspended solids.	ST-0061
Color	Un-dyed	
Water, wt%	45.0 min. 54.0 max.	D-1123
Specific Gravity, 60/60°F (15.6°C)	1.310 min. 1.370 max.	D-1122
Reserve Alkalinity, ml	190 min. 250 max.	D-1121
pH, undiluted	9.5 min. 11.0 max.	D-1287
Chloride Ion, ppm	300 max.	CST 38.17
* Methods of Test are available upon request.		

TO MAKE JEFFCOOL E100N COOLANT FROM THE ADDITIVE PACKAGE:

COMPOSITION	% BY WEIGHT	% BY VOLUME
Ethylene Glycol (coolant grade)	93.0384	93.9414
JEFFCOOL AdPac-N	6.94	6.035
JEFFCOOL AdPac-P **	0.02	0.022
Dye, Intralite, Turquoise, powder	0.0016	0.0016
** JEFFCOOL AdPac-P must be used in conjunction with AdPac-N and AdPac-EP.		

TO MAKE JEFFCOOL® P155N COOLANT FROM THE ADDITIVE PACKAGE:

COMPOSITION	% BY WEIGHT	% BY VOLUME
Propylene Glycol (coolant grade)	47.9692	47.2992
Water, Deionized	48.44	50.00
JEFFCOOL AdPac-N	3.58	2.69
JEFFCOOL AdPac-P **	0.010	0.010
Dye, Intralite, Turquoise, powder	0.0008	0.0008
** JEFFCOOL AdPac-P must be used in conjunction with AdPac-N and AdPac-EP.		

Only pre-diluted versions of JEFFCOOL P150N coolant should be made from the JEFFCOOL AdPac-N product.

RECOMMENDED WATER SPECIFICATIONS

COMPONENT	SPECIFICATION
Chloride	25 PPM, Max.
Sulfate	25 PPM, Max.
Calcium	25 PPM, Max.
Magnesium	25 PPM, Max.
Total hardness	100 PPM, Max.

JEFFCOOL® AdPac-P Product

JEFFCOOL® AdPac-P is used in conjunction with JEFFCOOL AdPac-EP and AdPac-N to manufacturer JEFFCOOL coolants and heat transfer fluids. Please follow recommended manufacturing procedures and consult with your Huntsman technical representative prior to use.

STANDARD PACKAGING

55 gallon, non-returnable steel drum (450 pounds net, 490 pounds gross). Please refer to the Material Safety Data Sheet (MSDS) for this product for instructions on safe and proper handling and disposal.

SPECIFICATIONS	
Color, APHA	50 Max
Water, weight %	0.4 Max
pH (2.5% Aqueous)	5.0 – 7.5

TYPICAL PHYSICAL PROPERTIES	
Form	Liquid
Specific gravity, 25°/25°C	1.01
Viscosity cps at 25°C	325
Pour point	-29 °C
Solubility in water at 25 °C	Insoluble



JEFFCOOL® Product Analytical Program Services

HUNTSMAN JEFFCOOL® PRODUCTS – ANALYTICAL PROGRAM SERVICES

Huntsman Corporation provides a full service testing program for the JEFFCOOL product line. Huntsman Corporation has developed a Sample Test Kit Program to provide proper product integrity and maintenance for JEFFCOOL products. Services include: sample test kit, initial fill & annual product analysis, and recommended fluid maintenance procedures.

SAMPLE TEST KITS

Sample test kits are free of charge to Huntsman distributors and their customers who purchase JEFFCOOL products. Kits are available upon request. The kits include: self-addressed shipping box, pre-labeled sample bottle, weather-proof self-adhesive product installation tag and detailed sampling procedures.

ANALYSIS

Huntsman provides free analysis on initial system charges to ensure product integrity and annual analysis at no charge for system maintenance. The analysis is sent to the customer and a copy is supplied to the distributor servicing that customer, if applicable.

PRODUCT MAINTENANCE AND RECOMMENDATIONS

Sample evaluation recommendations are made to ensure proper fluid maintenance. These recommendations are based upon a variety of criteria that must be present in fluids to function properly. Huntsman has a full line of supplemental coolant additives to effectively maintain these criteria over extended service intervals.

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Emergency Assistance

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9300 or 1-800-328-8501.

For all other emergencies, call
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