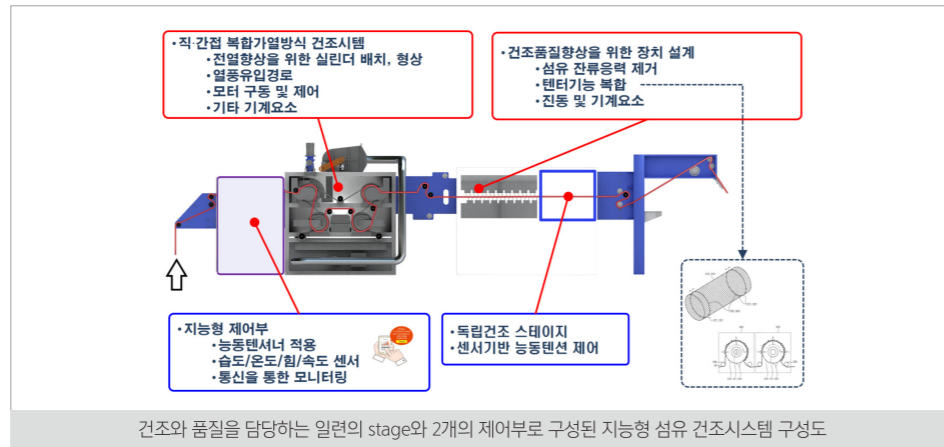


연구책임자
에너지효율·소재연구본부
에너지절약연구실
김성일

에너지 고효율 지능형 섬유 건조시스템

직간접 복합가열방식과 지능형 제어구조를 채택함으로써 에너지 고율화와 생산성/품질이 동시에 향상된 국내 기술원천의 지능형 복합 건조시스템.

기술의 구성도/개념도



기술의 주요 내용 및 특징

- 에너지효율과 건조 품질을 동시에 만족시킬 수 있는 시스템
 - 간접가열과 직접가열이 일련의 흐름 상에 복합적으로 이루어지는 전열방식
 - 섬유 내 잔류응력을 효과적으로 제거하는 장치 구조
- 4단의 전열실린더가 3차원 구조로 이루어진 컴팩트한 장치 구조
 - 통기 건조방식 건조장치 크기의 1/3 수준
- 다양한 sheet type 피 건조물에 적용가능한 범용성 구조
 - 섬유류를 포함하여 제지, 한지, 특수지 등

기술의 적용처

응용분야	적용제품	
제지산업, 섬유산업, 단열소재 등 기능성 시트제품 관련 산업	섬유, 제지, 한지, 특수지, 기능성 제품	-

문의
한국에너지기술연구원
기술사업화실

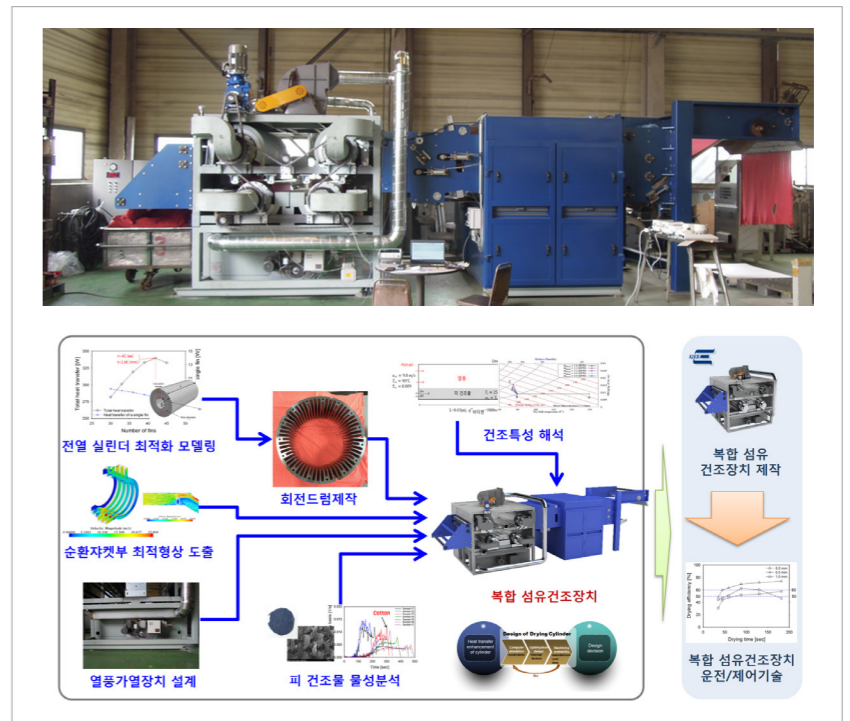
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기술의 비교우위성/ 기존 기술 대비 차별성

기존 기술	본 기술
<ul style="list-style-type: none"> 에너지효율과 건조 품질 모두를 만족시킬 수 있는 건조기술 부재 - 기존 열풍방식: 품질은 좋으나, 에너지효율이 낮음 - 기존 스팀방식: 에너지효율은 높으나, 품질이 낮음 건조장치의 규모가 크고 고가임. 	<ul style="list-style-type: none"> 에너지효율과 건조품질을 동시에 만족시킬 수 있는 건조기술 - 기존 건조장치 대비 약 15% 에너지효율 향상 - 실시간 계측을 통한 가변적 제어 - 운전 안정성이 향상된 PnP 시스템 컴팩트한 건조시스템 구조 - 통기식 건조장치의 1/3 크기

실험 및 실증 데이터



기술의 성숙도



[TRL 6: 파일럿 규모 시제품 제작 및 성능 평가]

순번	발명의 명칭	출원번호	출원일자	등록번호	등록일자
1	섬유/제지용 복합 건조 시스템	-	-	10-1745334	2017.06.02
2	섬유 건조장치 및 이의 제어방법	10-2016-0181832	2016.12.29	-	-
3	Sheet type materials drying apparatus and a method for controlling the same	PCT/KR2017/008581	2017.08.09	-	-

Principal researcher

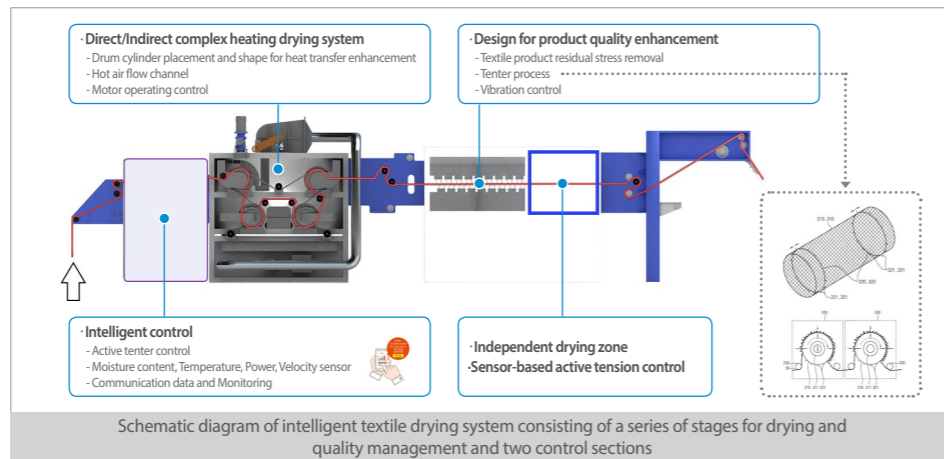
Energy Saving Laboratory of the Energy Efficiency Technologies and Materials Science Division

Kim Seong-Il

High-energy efficiency intelligent textile drying system

The present technology relates to an intelligent complex drying system developed by Korea's own source technology. The technology employs a both a direct and indirect complex heating method and an intelligent control structure to increase the energy efficiency and improve the productivity and quality.

Structural Diagram/Conceptual Diagram



Description and Characteristics of Technology

- System meeting the needs for both high energy efficiency and high drying quality
 - Complex electric heating method by which indirect heating and direct heating are performed successively
 - Apparatus structure effectively removes residual stress in textile
- Compact apparatus structure consisting of four stages of electric heating cylinders in a 3D structure
 - 1/3 of the size of air ventilation-based drying apparatus
- General purpose structure applicable various sheet types of materials to be dried
 - Textile as well as paper-making industry, Korean traditional paper, special paper, etc.

Scope of Application

Application Fields	Products	
Paper-making industry, textile industry, functional sheet products such as insulation materials	Textile, paper-making industry, Korean traditional paper, special paper, functional products	-

Inquiries

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Comparative advantages of technology / Differentiation from existing technologies

Conventional Technology	Present Technology
<ul style="list-style-type: none"> The conventional technologies fail to satisfy the needs for both high energy efficiency and high drying quality. <ul style="list-style-type: none"> - The conventional hot air drying provides high drying quality but low energy efficiency. - The conventional steam drying provides high energy efficiency but low drying quality. The drying apparatus is large and expensive. 	<ul style="list-style-type: none"> The present drying technology satisfies the needs for both high energy efficiency and high drying quality <ul style="list-style-type: none"> - The energy efficiency is about 15% higher than that of the conventional drying apparatus. - The operation is variably controlled through real-time measurement. - The PhP system has improved the operation stability. The present technology includes a compact drying system. <ul style="list-style-type: none"> - The size is 1/3 of the air ventilation-based drying apparatus.

Experimental and empirical data

Complex textile drying apparatus control and operating

Complex textile drying apparatus design

Complex textile drying apparatus

Analysis of drying characteristics

Analysis of final product

Design of hot air supplement system

Optimization of jacket shape

Optimization of cylindrical drum

Maturity level of technology



[TRL 6: pilot-scale prototype preparation and performance evaluation]

No.	Title of Invention	Application Number	Application Date	Registration Number	Registration Date
1	Complex drying system for textile and paper	-	-	10-1745334	2017.06.02
2	Textile drying apparatus and a method for controlling the same	10-2016-0181832	2016.12.29	-	-
3	Sheet type materials drying apparatus and a method for controlling the same	PCT/KR2017/008581	2017.08.09	-	-