



MOP Geneva Nov 2012

GIZ Proklima – Hydrocarbon room airconditioners



GIZ Proklima

Geneva, Nov 2012

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Chateaux Snow 2011 – its all about insulation

Davos Switzerland, conserved snow by using insulation and opening the season already last week!





GIZ and Natural blowing agents, refrigerants

Natural Ultimate solution which started already in 1995-96 with the Project Qindao Haier

Going natural means to have a sustainable long term development and not converting every 3-4 years

Conversions are a heavy burden not so much money wise but:

- R&D Resources / Production / Marketing / Intellectual capacity

➡ As a company once you need to convert the focus is on the conversion not further development – a conversion takes between 1-3 – so do it once please.



Converting XPS foam production CO₂

Beijing Beipeng New Building Materials Co. Ltd near Beijing already producing two years with environmentally friendly CO₂ as blowing agent

More than 8000 Tons of XPS produced with 0 ODP / Low GWP (goal MLF)



The company bought lately another plants for the production of XPS with CO₂ technology on their own behalf.



Lab. Equipment for XPS foam with CO₂

Leading universities in Beijing receive training equipment for climate friendly insulation material

Projects by GIZ and MEPFECO to provide in-house knowledge capacity building and support the local industry with the upcoming HCFC phase-out.



Beijing Technology & Business
University

Beijing University of Chemical
Technology



AC Gree-Godrej (India)-Haier-TCL Spin offs

What is required for a safe production and can we do it? The first question of all the producers!

- With the conversions of the production lines at Gree, Godrej with the help of GIZ and TÜV approvals a production concept has been realized.
- TCL, Haier and MIDEA with the support of UNIDO are following
- Tools for complete cycle from production setup to finished products are available
- Whitebook Guidelines for AC production is thereby advisable literature for any company who wants to convert to any “Flammable refrigerant” also for R32 and HFOs.



AC Gree-Godrej (India)-Haier-TCL Spin offs

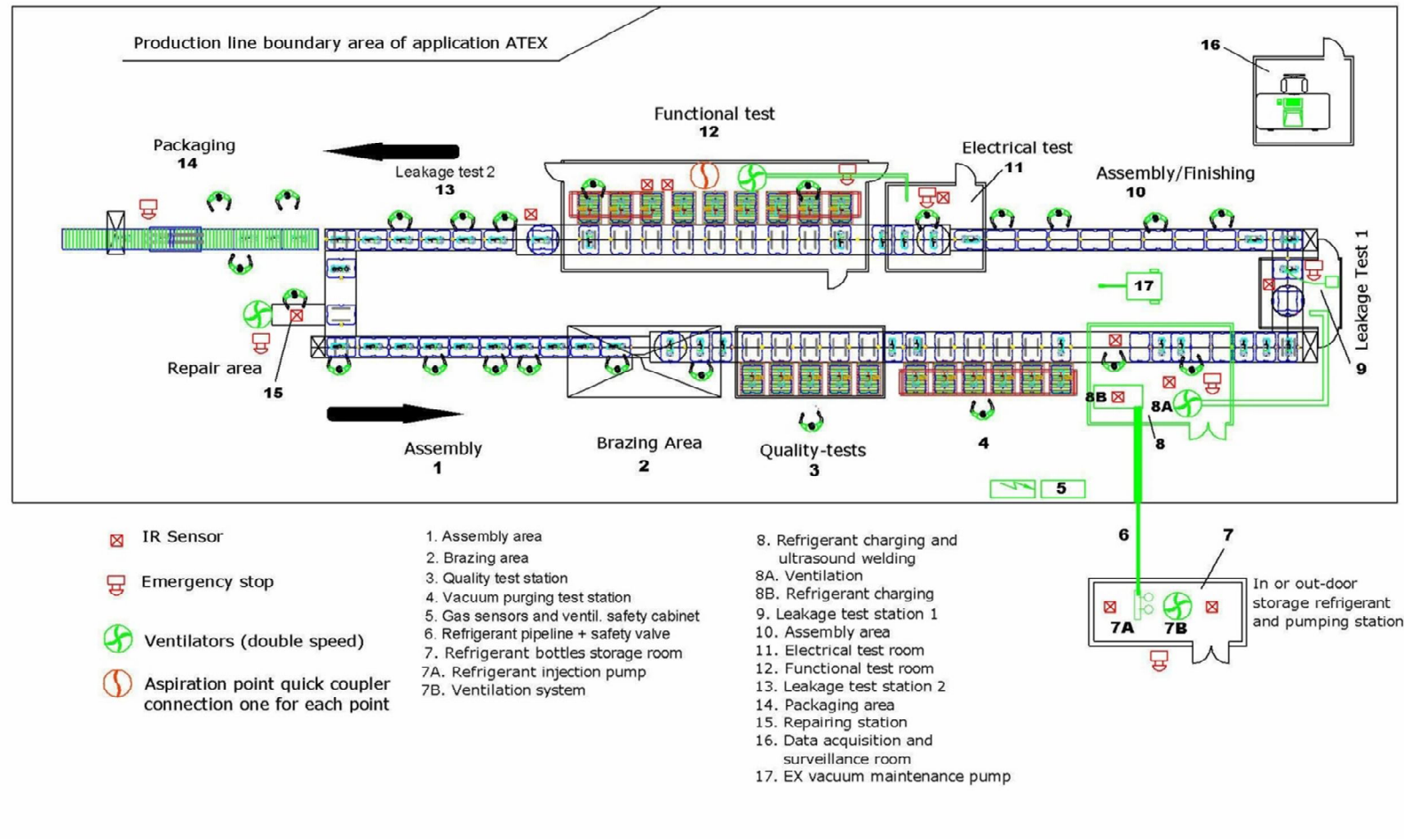
Advantages recognized during the conversion projects to HCs

- A thorough review of production processes as well as design of the units is being made – component level research!
- The HC units due to the reviewed production process and procedures are by far better than the old R22 units – better performance and leakage!
- Servicing aspects have been integrated from the design phase on-wards
- Critical review and capacity building of the own service technicians

Capacities have been build in the design, performance and after sales service of the units which are a valuable asset for the companies.



R 290 production line





Godrej – TÜV approval production line

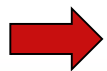


Production process is the same!

Additional equipment consists of safety sensors, ventilation and suitable charging equipment

The use of HCs results in better AC equipment due to review of processes and used equipment as well as intensified testing

The leakage rate of AC units of 5 gr/yr will be measured!



BETTER OVERALL LONG TERM PERFORMANCE



Godrej (India)



AC Cooling Capacity : 3375W
Compressor details : Rotary
Power Supply : 230/1/50
(V/Phase/Hz)
Power Input : 912W
EER : 3.7
Star Rating : 5 Star



AC Cooling Capacity : 4900W
Compressor details : Rotary
Power Supply : 230/1/50
(V/Phase/Hz)
Power Input : 1325W
EER : 3.7
Star Rating : 5 Star

EER = Excellent !!!

Gree



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EER = Excellent !!!



Wall-mounted Type

Model			GWC12AB-K5NNA4A	GWC09AA-K5NNA4A
Function			Cooling	Cooling
Capacity	Cooling	Btu/h	3500	2650
EER		W/W	3.61	3.61
Power Supply		Ph,V,Hz	1Ph,220-240V,50Hz	
Power Input	Cooling	W	970	734
Rated Current	Cooling	A	5.35	4.41
Airflow Volume	Indoor	m³/h	520	480
Indoor Unit				
Sound Pressure Level	Indoor	dB(A)(SH/H/M/L)	42/39/36/33	38/36/33/30
Outline Dimension	W×H×D	mm	872×198×283	815×165×267
Package Dimension	W×H×D	mm	978×323×400	978×323×400
Net Weight/Gross Weight	Indoor	kg	17/21	14/18
Outdoor Unit				
Sound Pressure Level	Outdoor	dB(A)	52	50
Piping Connection	Gas	mm	Φ12	Φ12
	Liquid	mm	Φ6	Φ6
Outline Dimension	W×H×D	mm	848×540×320	848×540×320
Package Dimension	W×H×D	mm	881×363×595	881×363×595
Net Weight/Gross Weight	Outdoor	kg	36.5/40.5	35/39
Loading Quantity				
	40' GP	sets	164	198
	40' HQ	sets	204	225

Portable Type

Model			GPC09AH-K5NNC3A
Function			Cooling
Capacity	Cooling	Btu/h	9000
EER		W/W	2.61
Power Supply		Ph,V,Hz	1Ph,220-240V,50Hz
Power Input	Cooling	W	1010
Rated Current	Cooling	A	5
Control Mode			Remote/Electrical
Airflow Volume		m³/h	320
Sound Pressure Level	Indoor side	dB(A)(H/M/L)	52
Outline Dimension	W×H×D	mm	300x803x345
Package Dimension	W×H×D	mm	355x850x565
Net Weight/Gross Weight		kg	28/32
Loading Quantity	40' GP	sets	264
	40' HQ	sets	396



Dehumidifier

Model			GDN10AH-K5EBB3A	GDN20AH-K5EBB3A
Dehumidifying Volume	L/D		4.8	11.04
Power Supply	Ph,V,Hz		1Ph,220-240V,50Hz	
Power Input	W		220	300
Power Current	A		0.98	1.33
Rated Current	A		1.62	1.75
Airflow Volume	m³/h		150	150
Sound Pressure Level	dB(A)		38	39
Water Tank Volume	L		4/4.8	4/4.8
Outline Dimension (W×H×D)	mm		343x523x262	343x523x262
Package Dimension (W×H×D)	mm		393x540x312	396x555x315
Net Weight/Gross Weight	kg		15/16.5	16/17.5
Loading Quantity (40' GP)	sets		860	860
Loading Quantity (40' GP)	sets		860	860



VDE Certification

 	Ref. Certif. No DE1-47108
IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME	SYSTEME DE L'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE CC
CB TEST CERTIFICATE	
Product Produit Name and address of the applicant Nom et adresse du demandeur Name and address of the manufacturer Nom et adresse du fabricant Name and address of the factory Nom et adresse de l'usine <small>Note: Write more than one factory, please repeat on page 2</small> <small>Note: Lister à plus d'une usine, répéter l'entrée la 2^{ème} page</small> Ratings and principal characteristics Valeurs nominales et caractéristiques principales Trademark (if any) Marque de fabrique (s'il y en a une) Model / Type Ref. Réf. De type Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaires, peuvent être indiquées sur la 2^{ème} page) A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	Accessioner (split-type) Gree Electric Appliances Inc. of Zhuhai Jiny West Road, Qianshan, 519070 ZHUHAI CHINA Gree Electric Appliances Inc. of Zhuhai Jiny West Road, Qianshan, 519070 ZHUHAI CHINA Gree Electric Appliances Inc. of Zhuhai Jiny West Road, Qianshan, 519070 ZHUHAI CHINA <input type="checkbox"/> Additional information on page 2 AC 220 ~ 240 V, 50 Hz, R 250 <div style="text-align: center;">  Factory unit: GWH050A-K09H1NAGV01 Outdoor unit: GWH050A-K09H1NAGV01 - T1MP - <input checked="" type="checkbox"/> Additional information on page 2 <div style="display: flex; justify-content: space-around;"> PUBLICATION EDITION </div> </div> IEC 60335-1(ed.4):am1;am2 IEC 60335-2-40(ed.4):am1;am2 IEC 62233(ed.1) 5006952-2608-0001/134185
This CB Test Certificate is issued by the National Certification Body Ce Certificat d'essai CC est établi par l'Organisation Nationale de Certification	
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> VDE Prüf- und Zertifizierungsinstitut GmbH VDE Testing and Certification Institute Zertifizierungsstelle / Certification </div> <div style="text-align: right;">  Signature R. Köhn </div> </div>	
Date: 2010-09-02	
Issued 2003-06	

Safety Unit

China, compressor development

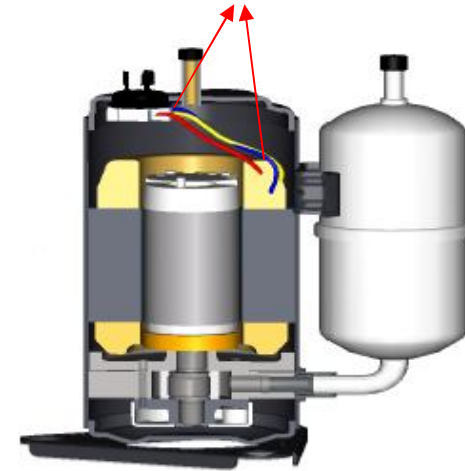
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R22



R290



MIDEA R290
compressors
smaller and better
efficiency



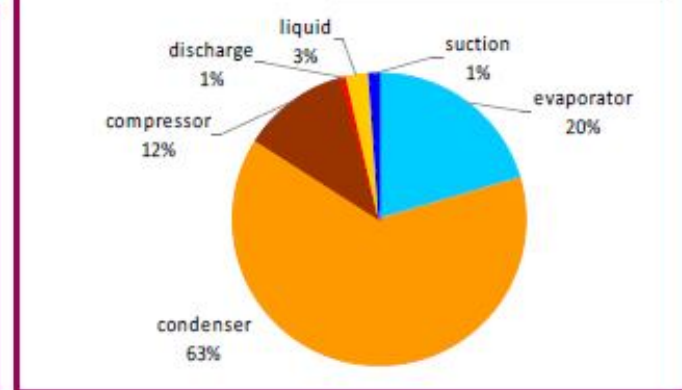
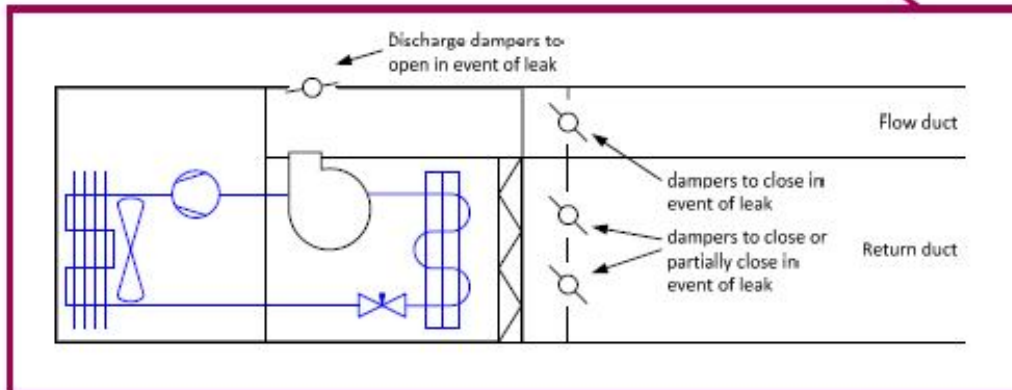
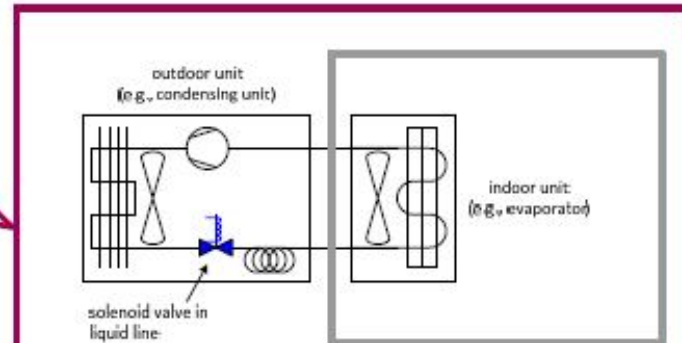
Gree's R290 compressors
currently cost only as much as
a R410A compressor. Cost is
likely to go down when
production increases.



AC unit technology R290

Mitigation actions

- Actions to reduce leak effects
 - Initiate full ventilation
 - Terminate compressor
 - Solenoid/shut-off valves
 - Redirect dampers

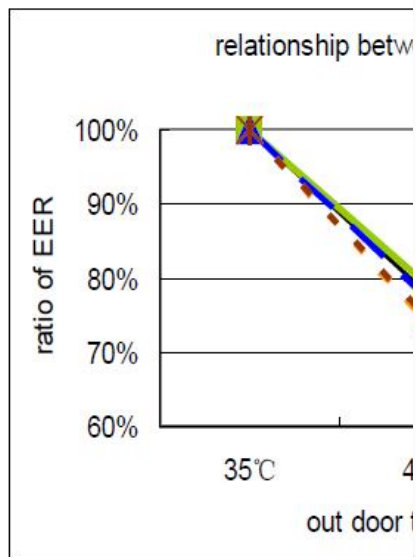


Midea following the trend

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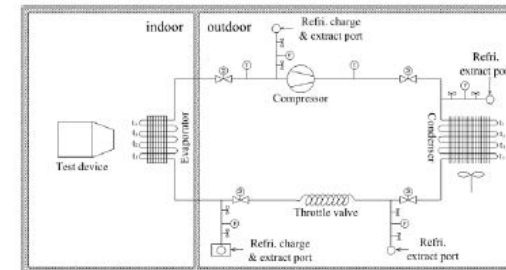
GMCC 美芝

Relationship between
out door **temperatu**

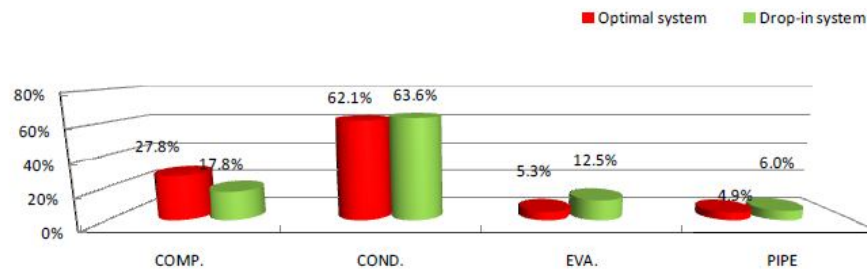


GMCC 美芝

Refrigerant distribution
in cycle system



Refrigerant distribution in cycle system



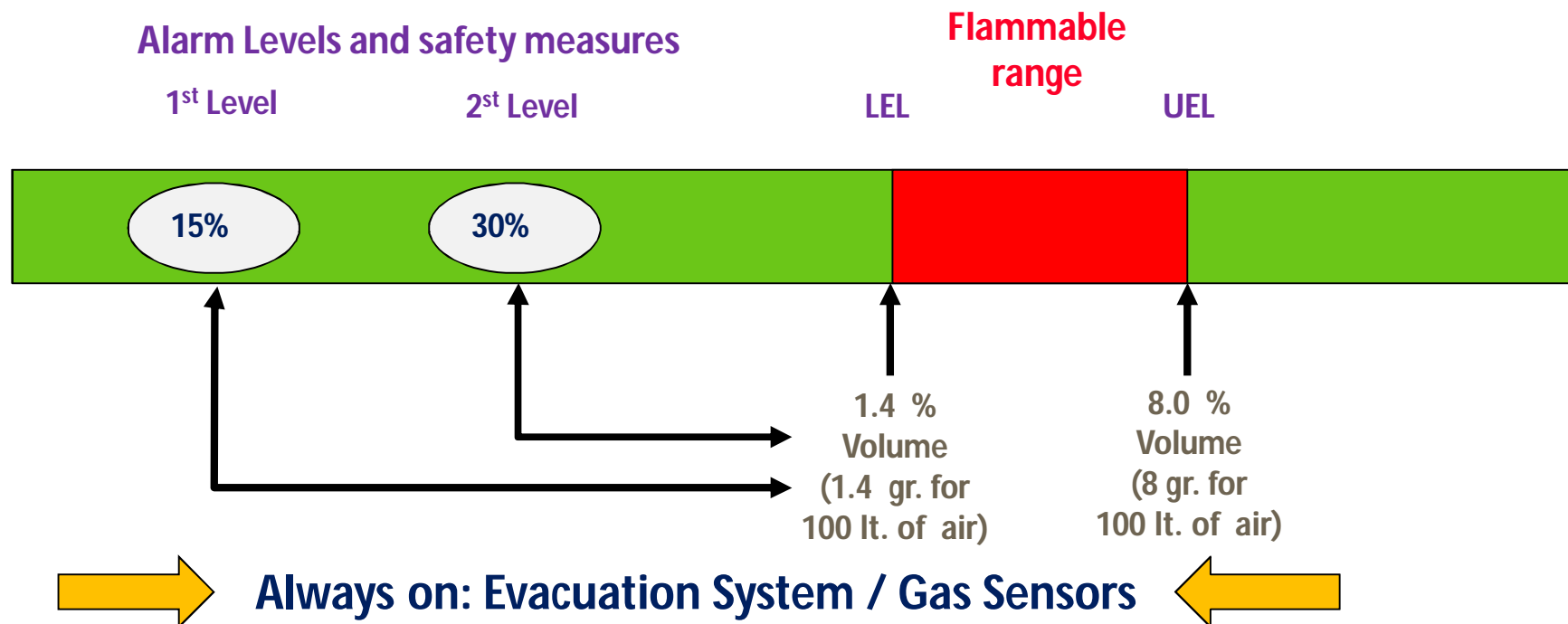
敬业

敬业 互动 高效 竞争

With the courtesy of Midea

Barrier Production - Flammable

For any blowing agent or refrigerant which is flammable (doesn't matter if it is low-mildly-highly flammable) care has to be taken. From producer point of view it also doesn't matter if it is premixed or anything else it is the content that counts!



Hundreds of foam as well as RAC companies are using flammable blowing agent Pentane and refrigerant R600a, R290.

Guidelines for XPS and AC production

Proklima International

Proklima International

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Zusammenarbeit (GIZ) GmbH



Guidelines for the safe use of flammable
refrigerants in the production of room
air-conditioners

A handbook for engineers, technicians, trainers and
policy-makers – For a climate-friendly cooling



Guidelines for the safe use of flammable
blowing agents in the production of extruded
polystyrene boards (XPS)

A handbook for engineers, technicians, trainers and
policy-makers – For a climate-friendly insulation

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On behalf of



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany

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Conclusive Remarks

After PU also XPS foams are available in the combination of CO₂ + ethanol, with the support of the Universities of Beijing R&D and training of future process engineers is being build up

R290 is not anymore a mirage but a reality, with the conversion of Gree and Godrej the milestones have been achieved:

- Production knowhow
- Design knowhow
- Certifications from National and international institutes TÜV, VDE

High performing R290 Acs with 0 ODP and Low GWP are available!



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Thank you for the attention

<http://www.giz.de/> or <http://www.giz.de/proklima>.