```
hrep_prod_wd  THM

⊢  ∀'a,'b:S.
|  equal
|  (rep_prod
|  ,select
|   (λrep:hprod('a; 'b)
|     → 'a
|     → 'b
|     → hbool. and
|               (all
|                (λp':hprod('a; 'b). all
|                                    (λp'':hprod('a; 'b). implies
|                                                         (equal
|                                                          (rep(p')
|                                                          ,rep(p''))
|                                                         ,equal
|                                                          (p'
|                                                          ,p''))))
|               ,all
|                (λp:'a → 'b → hbool. equal
|                                       (is_pair(p)
|                                       ,exists
|                                        (λp':hprod('a; 'b
|                                                   ). equal
|                                                      (p
|                                                      ,rep(p'))))))))
| by HN THEN StrongAuto THEN Try (Complete (Unfold `label` 0))
|    THEN
|    Try
|    (Complete
|     (Unfold `label` 0 THEN MemEqCD THEN Try (Complete Auto)
|      THEN
|      Unfold `label` 0
|      THEN
|      MemEqCD
|      THEN
|      Try (Complete Auto)
|      THEN
|      Unfold `label` 0
|      THEN
|      Try (Complete Auto)))
|
1. 'a : S
2. 'b : S
⊢  rep_prod
|  =
|  (@_b rep:hprod('a; 'b) → 'a → 'b → hbool
|     ((∀_b p',p'':hprod('a; 'b).
|         ((rep(p')) =_b (rep(p'')))⇒_2(p' =_b p''))
|      ∧_2
|      (∀_b x:'a → 'b → hbool
|         ((is_pair(x)) =_b (∃_b p':hprod('a; 'b). (x =_b (rep(p')))))))
| by Unab [`hrep_prod`;`hmk_pair`] THEN AbReduce 0
|
```

```
1. 'a : S
2. 'b : S
⊢  (λp:'a×'b. λa:'a. λb:'b. (a =_b 1of(p))∧_2(b =_b 2of(p)))
   =
   (@_brep:hprod('a; 'b) → 'a → 'b → hbool
      ((∀_bp',p'':hprod('a; 'b).
          ((rep(p')) =_b (rep(p'')))⇒_2(p' =_b p''))
       ∧_2
       (∀_bx:'a → 'b → hbool
          ((is_pair(x)) =_b (∃_bp':hprod('a; 'b). (x =_b (rep(p')))))))
  by L Thm: rep_prod_axiom THEN StrongAuto
     THEN
     Try (Complete (Unfold `label` 0))
END
```